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MOTOR AGE

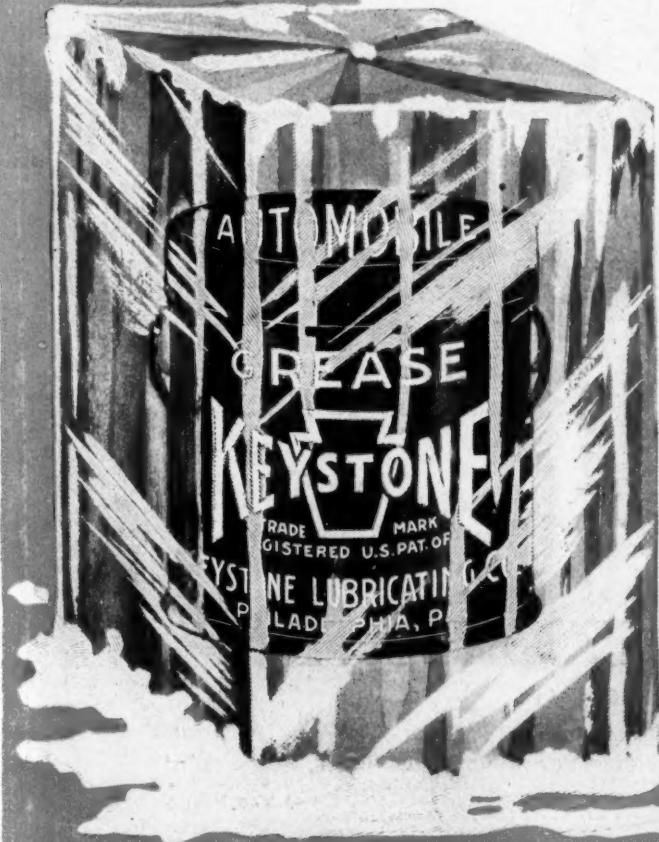
VOLUME XIV

CHICAGO, DECEMBER 31, 1908

NUMBER 27

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NEITHER Cold nor Heat affects the lubricating or lasting qualities of "Keystone" Grease. Extreme climatic conditions cannot impair its efficiency. Thousands of pounds of "Keystone" Grease are shipped annually to Alaska and the Canal Zone, because "Keystone" Grease is the only lubricant that works perfectly in all temperatures. "Keystone" Grease is the lubricant for the manufacturer to recommend to make sure his cars will not lack for proper lubrication. "Keystone" Grease is a business builder for the dealer, as every can is a guarantee of satisfaction and means a pleased customer. It is the ONLY lubricant for the Automobilist to use as a protection against lubrication troubles and extravagances, being most economical in its lasting qualities.

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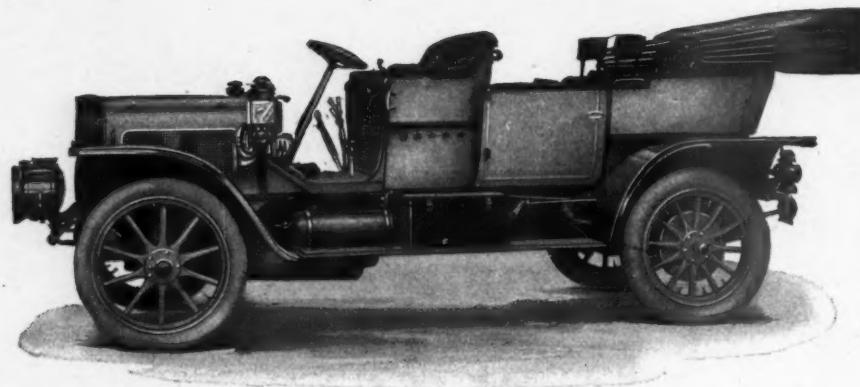
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THE MODEL "M" WHITE STEAMER

Is the Most Luxurious Car On the Market



The luxury of the White Steamer is unequaled by any other machine. There is no car, however expensive, which has better upholstery, better springs or better finish. Owing to the compactness of the mechanism, the body is much more commodious than in any car of similar wheel-base (122 inches). Few other makes have such a liberal tire equipment (36 x 4 on the front wheels and 36 x 5 on the rear wheels).

The luxury of any car, however, depends largely upon its riding qualities and here the White is "in a class by itself". It is the only car where starting and changes of speed can be effected without jerks or jolts. It is the only car which runs noiselessly under all conditions. It is the only car which is free from vibration, because it is the only car where the power is applied evenly and continuously, and not spasmodically.

Just as our Model "M", priced at \$4,000 is the most desirable of the higher priced cars, so our Model "O", at \$2,000 predominates among moderate priced machines.

Write for descriptive matter.

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MOTOR AGE

1909 Show Circuit Opens

*A*MERICA'S first 1909 motor car exhibition, ready to open in the Grand Central Palace, will disclose versatility of design on every hand, coupled with indications of a tidal wave of standardization in the near future

NEW YORK, Dec. 28.—Motoring America is on the eve of the first big show of the 1909 season, the annual exhibition of the A. M. C. M. A., which opens New Year's eve. When the little army of workmen was turned loose in the big Grand Central palace this morning there was little indication that in the next 4 days the place would be converted into a show on which \$30,000 has been spent in the way of decorations and which has taken months and months of preliminary labor to prepare the details. Yet H. O. Smith, chairman of the show committee, and Alfred Reeves, general manager of the American Motor Car Manufacturers' Association, were confident that the annual effort of the independents would far surpass any one of its previous affairs, not only in size, but in point of decorations, attendance and everything else.

It was no light task that faced the workmen. They had before them 70,000 square feet of space which had to be converted into an up-to-date motor car show, with booths prepared for 301 exhibitors, of which number 220 will show sundries and accessories and the others motor cars, both of American and foreign make. They practically had to rebuild the palace inside and all that for 7 days the great American people might be able to see the 1909 ideas in motor cars and accessories; they had to follow out the decorating scheme of S. R. Ball, who went back to the early English period for his idea and who intends to sprinkle the exhibition halls with heroic statues, while 9,000 incandescent lights will glower from all corners of the place. There will be searchlights galore and in the garden itself there will be bevel glass mirrors, oil paintings and the hundred and one little things that go to make a show beautiful and furnish a fitting background for the display of cars that will crowd the spaces of the exhibitors.

After all this is done the workmen will prepare for the invading army. A complete telephone system will have to be installed, it being the intention to give every exhibitor a telephone and to place his name in a special telephone directory that is to be issued. There must be booths opened for telephone and telegraph service, and after the sign painters, the decorators, the electricians and others get through then the real work of installing \$1,000,000 worth of motor goods in the 300 booths will begin, a gigan-

Tom Wilden



tie job in itself, as anyone can testify.

All this hustle and bustle, all this work and worry, all this expense are in order that everything will be in readiness Thursday afternoon for the private view at 3 o'clock, a custom which was instituted in the old days and which never has been abandoned. For this private view 3,000 invitations have been issued to high city officials, city general sessions and superior court judges, state senators and assemblymen; members and officials of the Automobile Club of America and to the officers of all clubs allied with the American Automobile Association.

Of course everything will not be in readiness for this informal opening. There is a limit to all things, and such is the case with motor car shows, despite the general belief that nothing is impossible in this line. There always are a few slow ones and there is no reason why this should not be so this week. But it is confidently believed and hoped that by 8 o'clock Thursday evening the show machinery will be well oiled and running smoothly, so that when Patrick F. McGowan, president of the board of aldermen of New York city, stands up to make his address of welcome everything will be shipshape and the great show will start in its career that will extend over the brief period of 7 days in a very graceful manner.

Great stress is laid upon the McGowan end of the program, for it marks the first time in the history of motor car shows in America that exhibitions of this sort have been officially recognized by the city government. A delegation from the A. M. C.

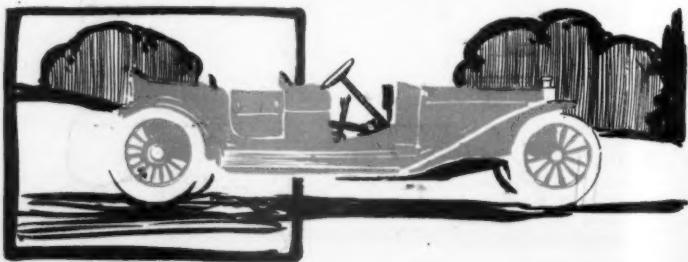
M. A. called upon Mayor McClellan and invited his honor to do the graceful on the occasion of the opening of the show. The mayor gave the motor car tradesmen greeting and assured them it would afford him great pleasure to be among those present on the momentous evening; that he himself or a representative of the municipality would be "on the job." It later developed, however, that his honor could not go because of being called out of the city by an important engagement. He did not go, however, without turning over to President McGowan, of the board of aldermen, the honor of making the address of welcome and giving the freedom of the city to the makers and dealers.

Society seems to be taking even a greater interest in the show this year than ever before, which is saying a great deal. H. O. Smith and his colleagues have discovered this and on Tuesday night, January 5, every effort will be made to get out a record attendance. It will be "society" night, and the aim will be to beat the best showing made by the horse show. But this interest is not confined alone to society. You notice it on every hand. The hotels are particularly strong in this boosting game and for the first time in motor history the leading hostelleries will be decorated especially for the motor car show week. Not only will the exterior and interior of the hotels be decorated in the red and green that make up the palace show colors, but the menu cards will bear a reproduction of "Miss Liberty at the Wheel," the motor row will get out its glad rags and all through the week the colony will flash the red and green.

It is confidently predicted by the promoters of the show that the attendance for the week will run as high as 100,000. It may be even more, the sanguine say, but if it touches six figures everyone will be happy. There is every reason to believe it will not be far off the mark, for right now New York is brimming over with show enthusiasm in marked contrast to a year ago. Just a thought of that anxious period gives Reeves the shivers. Then the country was panic-stricken and your average New Yorker hardly knew what was going to happen next in a financial way. It was small wonder, then, that all the shows were blighted by the flurry in stocks. It won't be that way now, that's safe to say.

Never before were the prospects so good for a large turnout of the trade itself. Reeves has been counting noses and he says there surely will be 2,500 retailers here from all sections of the country, which, he adds, ought to result in considerable new business, for it is not possible that all these agents would come to this show unless they had some idea of taking agencies. A new angle on the trade end of the show will be the attendance of the carriage dealers. When the national show of the carriage dealers' association was held in New York

a short while back it became most apparent to the manufacturers of motor cars that their friend the enemy, as it were, was greatly interested in the motor car and that he evidently was of the opinion that he could well afford to handle the new kind of rigs with profit to himself and the manufacturers of them. So in the preliminary show campaign Chairman Smith conceived the idea of extending the glad hand to the carriage dealers. Said glad hand addressed 2,000 invitations to that many carriage men whose rating in Dun's or Bradstreet showed better than \$50,000,



and it is expected most of them will take advantage of the opportunity to become better acquainted with the motor car trade that will be in the palace.

The National Retail Automobile Dealers' Association will make its headquarters at the palace during the week, which will mark the debut of that lively young organization into New York. Just a little more than a year ago the National Retail Automobile Dealers' Association came into being—during the course of the 1907 Chicago show, to be more definite, its inception being due to the foresight of a few progressive dealers attending the show. They laid the plan before a number of their confreres there at the time, and the result is already history, the N. R. A. D. A. now being able to celebrate its first anniversary. The second annual meeting of the association will be held during the Chicago show next February, and it is confidently anticipated that the first year's work will show unusually good results.

The accessory department of the show is going to be decidedly prominent, more so, in fact, than ever before. Those who have followed the course and rise of the shows in this country can readily recall the time when there was no such thing as an accessory exhibit—when the vast amount of floor space represented by balconies and galleries and the hundred and one odd corners and nooks that are now so zealously sought out and filled were vacant. Simply because there was no one to fill them—there were no manufacturers of accessories pure and simple, and the dealer in supplies had yet to come into existence, so that a motor car show could then be comprised by the exhibits of its main floor and with room to spare. Then along came the accessory manufacturer, and with the increasing demand for space in which to show cars he was perforce relegated to the upper regions or to the basement. He had to bid for space as an individual, and as the weight of his protest as such was small he had to take what was handed out, or nothing at all.

But in the course of a surprisingly short period the accessory manufacturers became so numerous that it was quite evident that in the aggregate their weight would be sufficient to exert no little influence, not alone for better treatment at the hand of the show-managing committees, but likewise for many other purposes where reforms were needed, and the outcome was the incorporation of the Motor and Accessory Manufacturers, which now includes practically all the important accessory manufacturing interests in the country in its membership and whose influence for good already has been felt.

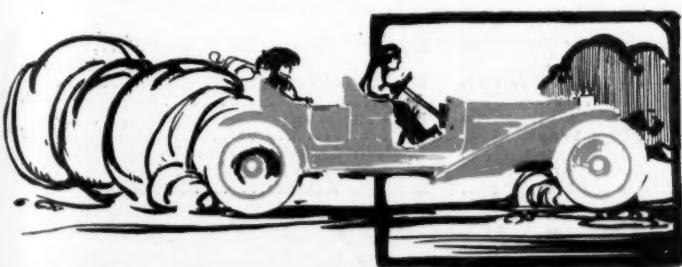
In order to confine the expense of its members for space at shows to legitimate events of this kind the Motor and Accessory Manufacturers issue sanctions for shows, and the members of the association do not exhibit at those which have not received the approval of the governing body. And by dealing with show management as a unit much expense and inconvenience is saved the members, the Motor and Accessory Manufacturers being one of the largest single purchasers of space at the palace this week. The entire needs of its membership are contracted for en bloc



and the association itself then parcels out the space and awards the different locations, the accessory manufacturers themselves thus having no dealings whatever with the show management as individuals.

It must not be forgotten also that the importance of the palace show is increased by the coöperation of the importers, who have cast in their lot with the independents this time and who will be prominently before the public for the entire week. A year ago the importers held a show of their own, a beautiful one, it is admitted, but this time they concluded to get under the banner of the A. M. C. M. A. There will be fourteen exhibits of foreign cars, and it is said this will be the only exhibit that will be made this winter by the importers. Of course, these same importers cannot help crowing a bit over their successes on the racing path last summer and fall, and prominent in their section will be the Fiat, Benz and Lancia, which made such brave showings at Savannah. Among the foreign models to be shown will be the Panhard, C. G. V., de Dietrich, Fiat, Isotta, Lancia, Hotchkiss and Renault. The highest priced car in the lot will be a C. G. V., which will take five figures to buy. It has a 90-120-horsepower four-cylinder motor.

The importers are taking a great deal of interest in the palace show and it goes without saying that the exhibit of the foreign cars will be fully up to the mark of a year ago. Indeed, some of them intended to show a greater variety of cars than ever before, the Panhard line being particularly large and impressive. As usual, the foreigners will mostly quote prices on the chassis alone.



Importers at the Show

By A. B. Tucker

THE impression which seemed to be current among many friends of the foreign car that the importers, as a body, would not exhibit this year, but that simply individual showings would be made, is in error and has caused the Importers' Automobile Salon to announce that it has secured over 15,000 feet of the best space on the main floor of the Grand Central palace, and will exhibit there in connection with the American Motor Car Manufacturers' Association.

The exhibition which was given by the Importers' Automobile Salon last year at the Madison Square garden is famous as the most beautiful show which has ever been given in this country. The year previous to the Madison Square show some of the imported cars were displayed at the Automobile Club of America show at the Grand Central palace, and others at the exhibition of the Association of Licensed Automobile Manufacturers at the garden, according to the attitude of the several importers to the Selden patent.

Organized in 1904

The Importers' Automobile Salon was incorporated on July 29, 1904, with a comparatively small membership and its work since that time protecting and encouraging the introduction of foreign cars has been so successful that at the present time its membership is composed of practically all of the importers of foreign cars.

Shortly after the garden show last year C. R. Mabley resigned as general manager and the efficient work of Walter R. Lee, at that time secretary, was recognized and he was promoted to the position vacated by Mr. Mabley. The other officers of the salon are: A. Massenat, president; W. H. Barnard, vice-president; Paul Lacroix, secretary; Walter C. Allen, treasurer, and Charles H. Sherrill, counsel. The directors are: A. Massenat, E. R. Hollander, Walter C. Allen, A. A. Barrelet, Paul Lacroix, M. H. Barnard and H. Neubauer. The members of the salon include the Fiat Automobile Co., Renault Brothers' selling branch, Panhard & Levassor, C. G. V. Import Co., Hol-Tan Co., Delahaye Import Co., Palais de l'Automobile, S. B. Bowman Automobile Co., de Dietrich Import Co., New York Taxicab Co., Brewster & Co., Benz Auto Import Co. and Hotchkiss Import Co.

First Show in Macy's Hall

Originally the object of the salon was to hold shows and transact general motor business. The headquarters were then at Mount Vernon, N. Y., and meetings were held at any convenient place whenever business demanded.



AM-CMA Show

CARS

Atlas Motor Car Co.	Springfield, Mass.	Inter-State Automobile Co.	Muncie, Ind.
American Motor Car Co.	Indianapolis, Ind.	Jackson Automobile Co.	Jackson, Mich.
Austin Automobile Co.	Grand Rapids, Mich.	Kissel Motor Car Co.	Hartford, Wis.
Acme Motor Car Co.	Reading, Pa.	Kiblinger, W. H., Co.	Auburn, Ind.
Anderson Carriage Mfg. Co.	Anderson, Ind.	Lane Motor Vehicle Co.	Poughkeepsie, N. Y.
American Motor Truck Co.	Lockport, N. Y.	Lansden Co., The	Newark, N. J.
Buckeye Mfg. Co.	Anderson, Ind.	Marion Motor Car Co.	Indianapolis, Ind.
Brush Runabout Co.	Detroit, Mich.	McCue Co., The	Hartford, Conn.
Benner Motor Car Co.	New York City	Middleby Auto Co.	Reading, Pa.
Bristol Engineering Co.	Bristol, Conn.	Mack Bros. Motor Car Co.	Allentown, Pa.
Benz Auto Import Co. of America	New York City	Mora Motor Car Co.	Newark, N. Y.
Black Mfg. Co.	Chicago, Ill.	Mitchell Motor Car Co.	Racine, Wis.
Brewster & Co.	New York City	Maxwell-Briscoe Motor Co.	Tarrytown, N. Y.
Cartercar Co.	Pontiac, Mich.	Moline Automobile Co.	East Moline, Ill.
Cleveland Autocab Co.	Geneva, O.	Moon Motor Car Co.	St. Louis, Mo.
Chadwick Engineering Works	Pottstown, Pa.	Midland Motor Co.	Moline, Ill.
C. G. V. Import Co.	New York City	Nordyke & Marmon Co.	Indianapolis, Ind.
Coates-Goshen Automobile Co.	Goshen, N. Y.	National Motor Vehicle Co.	Indianapolis, Ind.
Cameron Motor Co.	Beverly, Mass.	Oakland Motor Car Co.	Pontiac, Mich.
Commercial Truck Co. of America	Philadelphia, Pa.	Overland Auto Co.	Indianapolis, Ind.
Crawford Automobile Co.	Hagerstown, Md.	Omar Motor Co.	Newark, N. Y.
Delahaye Import Co.	New York City	Pennsylvania Auto-Motor Co.	Bryn Mawr, Pa.
Dayton Motor Car Co.	Dayton, Ohio	Pittsburgh Motor Vehicle Co.	New York City
DeLuxe Motor Car Co.	Detroit, Mich.	Palais de l'Automobile	Pittsburg, Pa.
DeDietrich Import Co.	New York City	Panhard & Levassar	New York City
DeDion Bouton Selling Branch	New York City	Reed Motor Car Co.	New York City
Ford Motor Co.	Detroit, Mich.	Regal Motor Car Co.	Detroit, Mich.
Fiat Automobile Co.	New York City	Renault Freres Selling Branch	New York City
Gaeth Automobile Co.	Cleveland, O.	Rapid Motor Vehicle Co.	Pontiac, Mich.
Gyroscope Automobile Co.	New York City	Reliance Motor Truck Co.	Detroit, Mich.
Grabowsky Power Wagon Co.	Detroit, Mich.	Reliable Dayton Motor Car Co.	Chicago, Ill.
Gramm-Logan Motor Car Co., The	Bowling Green, O.	Sultan Motor Co.	New York City
Holsman Automobile Co.	Chicago, Ill.	Speedwell Motor Car Co.	Dayton, O.
Hotchkiss Import Co.	New York City	Schacht Mfg. Co.	Cincinnati, O.
Hol-Tan Co.	New York City	Simplex Motor Car Co.	Mishawaka, Ind.
Isotta Import Co.	New York, N. Y.	Sharp Arrow Automobile Co.	Trenton, N. J.

ACCESSORIES

Automobile Supply Mfg. Co.	Brooklyn, N. Y.	Brownell Motor Co., F. A.	Rochester, N. Y.
Allen Auto Specialty Co.	New York City	Brandenburg & Co.	New York City
Anderson Forge Machine Co.	Detroit, Mich.	Bunnell & Co., J. H.	New York City
American Thermo Ware Co.	New York City	Comptoir d'Innovation pour Automobile	New York City
American Thermos Bottle Co.	Brooklyn, N. Y.	Coes Wrench Co.	Worcester, Mass.
Ajax-Grieb Rubber Co.	New York City	Columbia Nut & Belt Co.	Bridgeport, Conn.
American Ball Bearing Co.	Cleveland, O.	Conn. Telephone & Electric Co.	Meriden, Conn.
American Electrical Novelty & Mfg. Co.	New York City	Consolidated Rubber Tire Co.	New York City
Atwater-Kent Mfg. Works	Philadelphia, Pa.	Continental Caoutchouc Co.	New York City
Atwood Castle Co.	Amesbury, Mass.	Cowles, C., & Co.	New Haven, Conn.
Autocoll Co.	Jersey City, N. J.	Cramp & Sons, Wm., Ship & Engine Bid. Co.	Philadelphia, Pa.
Allen Fire Department Supply Co.	Providence, R. I.	Courtney Rubber Co.	New York City
Auto Improvement Co.	New York City	Caloris Mfg. Co.	Philadelphia, Pa.
Austro-American Separator Co.	Cleveland, O.	Downing, Chas. J.	New York City
American Metal Hose Co.	New York City	Dayton Rubber Mfg. Co.	Dayton, O.
Auto Tire Inflating Co.	Brooklyn, N. Y.	Driggs-Seabury Ordnance Corp.	Sharon, Pa.
Bosch Magneto Co.	New York City	Diamond Chain & Mfg. Co.	Indianapolis, Ind.
Briggs, Wm. M.	New York City	Diamond Rubber Co.	Akron, O.
Brown, John W., Mfg. Co.	Columbus, O.	Dixon Crucible Co., Jos.	Jersey City, N. J.
Burrowes, E. T., Co.	Portland, Me.	Dow Tire Co.	New York City
Batavia Rubber Co.	Batavia, N. Y.	Duffy Grease Co.	New York City
Buffington & Co., C. A.	Berkshire, N. Y.	Elite Mfg. Co.	Ashland, O.
Brown Co., The	Syracuse, N. Y.	Ennis Rubber Mfg. Co.	Newark, N. J.
Burnet Compound Spring, Inc.	Newark, N. J.	Empire Auto Top Co.	New York City
Bretz, J. S., Co.	New York City	Edmunds & Jones Mfg. Co.	Detroit, Mich.
Buda Foundry & Mfg. Co.	New York City	Electric Storage Battery Co.	Philadelphia, Pa.
Badger Brass Mfg. Co.	Kenosha, Wis.	Empire Automobile Tire Co.	Trenton, N. J.
Baldwin Chain & Mfg. Co.	Worcester, Mass.	Excelsior Storage Battery Co.	New York City
Bowser, S. F., & Co.	Fort Wayne, Ind.	Eastern Carbon Works	Jersey City, N. J.
Briscoe Mfg. Co.	Newark, N. J.	F. R. V. Auto Parts Co.	New York City
Brown-Lipe Gear Co.	Syracuse, N. Y.	Fleintje, Ernest	Cambridge, Mass.
Byrne-Kingston Co.	Kokomo, Ind.		

Exhibitors' List

Firestone Tire & Rubber Co.	Detroit, Mich.
Fisk Rubber Co.	Chicopee Falls, Mass.
Federal Mfg. Co.	Lowell, Mass.
Geiszler Bros.	New York City
General Storage Battery Co.	Boonton, N. J.
G & J Tire Co.	Indianapolis, Ind.
Gabriel Horn Mfg. Co.	Cleveland, O.
Gilbert Mfg. Co.	New Haven, Conn.
Garage Equipment Co.	Milwaukee, Wis.
Gloversville Auto Glove Co.	Gloversville, N. Y.
Goodrich Co., B. F.	Akron, O.
Goodyear Tire & Rubber Co.	Akron, O.
Gray & Davis.	Amesbury, Mass.
Gray-Hawley Mfg. Co.	Detroit, Mich.
Gemmer Mfg. Co.	Detroit, Mich.
Guaranty Faultless Auto Tube Co.	New York City
Healy Leather Tire Co.	New York City
Hart-Kraft Motor Co.	York, Pa.
Hill Mfg. Co.	Buffalo, N. Y.
High Wheel Auto Parts Co.	Muncie, Ind.
Hydraulic Oil Storage Co.	New York City
Ham Mfg. Co., C. T.	Rochester, N. Y.
Harris Oil Co., A. W.	Providence, R. I.
Hartford Rubber Works Co.	New York City
Hartford Suspension Co.	Jersey City, N. J.
Heinze Electric Co.	Lowell, Mass.
Herz & Co.	New York City
Hess-Bright Mfg. Co.	Philadelphia, Pa.
Hefeker Co., The	Boston, Mass.
Hyatt Roller Bearing Co.	Newark, N. J.
Haveline Oil Co.	New York City
H. & C. Bottle Mfg. Co.	New York City
Jeffrey-Dewitt Co.	Newark, N. J.
Johnson, Isaac G., & Co.	Spuylton Duyvil, N. Y.
Jones Speedometer Mfg. Co.	New York City
Keystone Lubricating Co.	Philadelphia, Pa.
Kokomo Electric Co.	Kokomo, Ind.
Lavalette & Co.	New York City
Lutz-Lockwood Mfg. Co.	New York City
L. I. Auto Supply Mfg. Co.	Brooklyn, N. Y.
Leather Tire Goods Co.	Upper Newton Falls, Mass.
Light Mfg. & Foundry Co.	Pottstown, Pa.
Miller, Chas. E.	New York City
Merchant & Evans Co.	Philadelphia, Pa.
Monitor Mfg. Co.	Boston, Mass.
Miller, Wm. P., & Sons.	Long Island, N. Y.
Metal Stamping Co.	New York City
Marko Storage Battery Co.	Brooklyn, N. Y.
Motor & Accessory Mfrs.	Newark, N. J.
McCord Mfg. Co.	Detroit, Mich.
Metzger, C. A.	New York City
Michelin Tire Co.	Milltown, N. J.
Morgan & Wright.	Detroit, Mich.
Mosler & Co., A. R.	New York City
Motzinger Device Mfg. Co.	New York City
Motz Clincher Tire & Rubber Co.	Akron, O.
Maxwell-Briscoe Motor Co., Annex.	Tarrytown, N. Y.
Motor Accessories Co., The	New York City
National Surety Co.	New York City
National Auto Top Co.	New York City
New Departure Mfg. Co.	Bristol, Conn.
Newmastic Tire Co.	New York City
National Battery Co.	Buffalo, N. Y.
National Carbon Co.	Cleveland, O.
National Coil Co.	Lansing, Mich.
N. Y. & N. J. Lubricant Co.	New York City
Noonan Tube & Machine Works.	Rome, N. Y.
National Tube Co.	Pittsburg, Pa.
Nathan Novelty Mfg. Co.	New York City
New York Coil Co.	New York City
Oliver Mfg. Co.	Chicago, Ill.
Owen, R. M., & Co., Premier.	New York City
Philadelphia Timer & Mach. Co.	Philadelphia, Pa.
Perfection Wrench Co.	New York City
Pneu l'Electric Co.	New York City
Poison, W. F.	Buffalo, N. Y.
Panasote Co., The	New York City
Pennsylvania Rubber Co.	Jeannette, Pa.
Pittsfield Spark Coil Co.	Dalton, Mass.
Quincy, Manchester Sargent Co.	Plainfield, N. J.
Rushmore Dynamo Works.	Plainfield, N. J.
R. I. V. Co., Inc.	New York City
Reeves, Paul, & Son.	Philadelphia, Pa.
Randall Faichney Co.	Boston, Mass.
Rands Mfg. Co.	Detroit, Mich.
Remy Electric Co.	Anderson, Ind.
Republic Rubber Co.	New York City
Royal Equipment Co.	Bridgeport, Conn.
Ruby Mfg. Co.	Tuckahoe, N. Y.
Raines & Co.	New York City
Stromburg Motor Device Co.	New York City
Standard Leather Washer Mfg. Co.	Newark, N. J.
Spare Motor Wheel of America, Ltd.	Chicago, Ill.
Snell, Irving.	Little Falls, N. Y.
Salman, John A., & Co.	Boston, Mass.
Stanley & Patterson.	New York City
Safety Device Co.	Indianapolis, Ind.
Sireno Co.	New York City
Sager Co., J. H.	Rochester, N. Y.
Shaler Co., C. A.	Waupun, Wis.
Shelby Steel Tube Co.	New York City
Smith Co., A. O.	Milwaukee, Wis.
Spicer Universal Joint Mfg. Co.	Plainfield, N. J.
Splitdorf & Co., C. F.	New York City
Sprague Umbrella Co.	Norwalk, O.
Standard Roller Bearing Co.	Philadelphia, Pa.
Standard Welding Co.	Cleveland, O.
Stewart & Clark Mfg. Co.	Chicago, Ill.
Swinehart Clincher Tire & Rubber Co.	Akron, O.
Seamless Rubber Co.	New Haven, Conn.
Smith Mfg. Co., I. J.	New York City
Shore Instrument & Mfg. Co.	New York City
Samson Leather Tire Co.	New York City
Sier Bath Co.	New York City
Specialty Co., The S. B.	New York City
Sherman, George S.	New York City
Troy Carriage Sun Shade Co.	Troy, O.
Travers Blowout Patch Co.	New York City
Timken Roller Bearing Axle Co.	Canton, O.
Vanguard Mfg. Co.	Joliet, Ill.
Veeder Mfg. Co.	Hartford, Conn.
Union Battery Co.	Belleville, N. J.
U. S. McAdamite Metal Co.	Brooklyn, N. Y.
Wilkinson Co., John S.	Newburgh, N. Y.
Wetherill Finished Casting Co.	Philadelphia, Pa.
Warner Gear Co.	Muncie, Ind.
Weed Chain Tire Grip Co.	New York City
Warner Instrument Co.	Beloit, Wis.
Westchester Appliance Co.	New York City
Wheeler & Schebler.	Indianapolis, Ind.
Whitney Mfg. Co.	Hartford, Conn.
Witherbee Igniter Co.	New York City
Wilson Trading Co.	New York City
Willet Engine & Carburetor Co.	Buffalo, N. Y.
York Auto Wheel Co.	York, Pa.
Ziegler Bullet Proof Cloth Co.	Chicago, Ill.

Why Americans Lead

By Benjamin Briscoe



NE of the significant features in connection with the rapid growth of the American motor car industry is a corresponding decrease in the business of the European manufacturer, who until only a short time ago had to be considered America's most formidable rival.

As a matter of fact the French manufacturer had to make preparations to defend his own market from the threatening invasion of the American product. Even the most ardent desire to pay tribute to the ingenuity of the foreign manufacturer cannot remain blind to the evidence that the American manufacturer has recognized the various problems and possibilities presented by the new conveyance and taken care of them.

Follow Their Ideals

It is undoubtedly true that the motor car designer, particularly the foreign one, is prone to follow his engineering ideal to the detriment of the utilitarian side of the question. The American manufacturer, on the other hand—and this is perhaps an attitude characteristic of the American spirit, exemplified in other fields—early came to the conclusion to cater to public demand as soon as such demand would assume definite shape. The result of this policy was the low-priced and economically-maintained car. The American car is nearly perfect and this result was attained not only by the use of good material and skilled workmanship, but principally by providing interchangeable parts, so that it is possible to produce units in great numbers with a single setting of machinery during the entire season. In short, the difference in foreign and American manufacturers' methods is that existing between making motor cars and manufacturing them. In the American method everything is interchangeable, and in the foreign method it usually is not. It is a well-known fact that has been established to the edification of a New York taxicab concern that it is rarely possible in the French product to take the motor out of one chassis and place it without difficulty and without drilling new holes.

The two principal reasons for the superiority of the American product consists in low price and interchangeability of parts—the one produced by the other. The third factor is the reliability of the American car, and an additional element and much greater field in this country upon which the motor car can show its usefulness. While the foreign manufacturer suffers from the evils of overproduction, the more important American makers find themselves in the other extreme.



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Four Mile Stones Will Mark New Season

THE historian of 1925, peering through the mists of the past in the hope of obtaining an impartial survey of the first quarter of the twentieth century, will designate 1909 as an important milestone in the phenomenal development of motoring in America. Four features, or aspects, of the 1909 industry determine this: First, the cheap-priced car—over 50 per cent of those to be manufactured will sell for less than \$1,400; second, the unprecedented activity in the lubrication field, every effort going towards insuring an adequate amount of oil at the proper time and to the proper part of the car under the varying conditions of road demands; third, the landslide towards magneto ignition, even cars selling for less than \$1,000 being regularly equipped with a magneto with a battery supplementary system; fourth, the trend towards smaller and more rational bodies, finding expression, chiefly, in the four-passenger toy tonneau and the landaulet type of town car.

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PUBLIC opinion moves slowly but surely, and all four of these major tendencies are but the expected deductions of the rational mind. The great law of nature is that the useful will eventually crowd out and kill the useless; the direct will ever supersede the indirect; the roundabout must give way to the simple; and, in motor car construction, the cumbersome and intricate cannot endure the competition of the simple and adequate. This is evidenced on every hand by the increased symmetry which characterizes the chassis of manufacturers who have been exhibiting annually for 3 years or more. Where curved and angular brake connections once ruled, straight ones now exist; where scattered motor accessories swathed the cylinders and crankcase 2 years ago, compactness and art now sit side by side; where the mid-chassis parts once presented a labyrinth of rods, levers and braces, order now rules, and where the dash once carried oilers, coils, speedometers, clocks, gauges and other accessories, nothing but a switch and sight-feed oiler give evidence of what once was. What is true with the externals holds good with the hidden parts of the car, and 1909 will be recorded as a vast stride towards the goal of simplicity.

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IN lubrication, simplicity is exemplified by the elimination of the many oil tubes surrounding the cylinders and passing in banks to the dash. In many cars this has been accomplished by placing an oil reservoir beneath the crankcase and locating in it a gear pump which elevates the oil to the crankshaft bearings, to the cylinders, or simply to the crankcase itself. With this system all external oil piping is eliminated, excepting where the pipe from the oiler to the top of the crankcase is outside of the case, which happens with one or two makers who place the oil pump outside of the reservoir. One or two makers use, in addition to this, a single lead to a sight feed on the dash which tells if the oil circulation is working or not. Externally, the only indication of lubrication is the filler cap leading to the crankcase and the breather tubes.

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THE general acceptance of the magneto also indicates simplicity: With a high-tension magneto the wiring is confined to four high-tension cables from the distributor plate to the plugs, and a low-tension wire to a dashboard switch. Compare this with the wiring of 2 years ago for a dual ignition

system, when more space was occupied by wiring than for any of the other motor systems, and the extent of the simplicity avalanche can be properly gauged. Still further in ignition simplicity is the coming of the magnetic plug, in which all make-and-break devices in conjunction with the cylinders are eliminated, and in which the cylinder castings suitable for a jump spark system can be used equally as well for a make-and-break. The wiring in this system is confined to that of a high-tension magneto, in fact, it is somewhat simpler, in that there are but four low-tension wires to the magnetic plugs, and a fifth running to the cut-out on the dash. In either ignition system, the sum total is the magneto, five wires and four spark plugs.

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IGNITION laurels do not all go to the magneto. Other ignition specialty manufacturers have been listening to the whistling in the branches, and have ready for the buyer small, compact, and efficient devices, which incorporate within a remarkably small space what the storage battery, the timer and dashboard coil accomplished 2 years ago. Instead of spreading the system over the running board, on the dash, and on one side of the motor, it is now incorporated in a unit, which looks to be an integral portion of the motor. One maker has gone still further, having entirely done away with the detached magneto and incorporated a magneto with a flywheel, which also does the duty of oil pump, and by which means the external appearances as well as the real nature of the motor is vastly simplified.

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WHILE simplicity in ignition and lubricating systems has been the prime mover in turning the attention of designers to these important departments of the car, the price status comes but as a corollary of these. Simplicity means fewer parts, quicker manufacture, less material, less weight, fewer opportunities for trouble, and quicker acceptance by the buyer. These factors alone have not worked the enormous price reductions that characterize the 1909 products. They constitute but one chapter. The other chapter must be read in the factory. Automatic machinery that simultaneously handles a dozen parts with human dexterity is a part of the answer. Expert factory organization is another part of the answer. Competent design-ership is a part of it, and the expert treatment and workmanship of metals is another. These combined, constitute the irresistible force that has been almost decimating the price list, and which has brought the 40-mile-an-hour car to the door of the artisan.

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BUT the little things also count in the car total. If price, ignition and lubrication constitute the major forces, transmission, brakes, rear axles, bodies, springs, cooling systems and equipments are forces that must be reckoned with and which are constantly shaping the destinies of the industry. Analyzing these one by one: The selective transmission has made rapid strides; over half a dozen firms which previously held out against its introduction have received it into the fold. The status of the planetary gearset remains where it was. The friction set has not lost ground and has not advanced much other than in the improvements of its individual exponents. The floating rear axle is on the gain, even manufacturers of other than ball bearings realizing its necessity.



Ready For the New Year—Is the Load Too Heavy?

Growth of the Shows

By H. O. Smith



H. O. SMITH

O BETTER illustration can be cited to demonstrate the magnitude of the industry than the wonderful growth of shows since their inception November 3-10, 1900, when the Automobile Club of America launched the first exhibition in Madison Square garden. To the A. C. A. belongs the credit of fathering motor exhibitions in this country. Little did this young

club realize what a huge oak its little show acorn would develop into.

That infant exhibition of but sixty-nine exhibitors created in the buying public the first desire to become motorists. The public knew little then of motor cars, and had a varying faith in the horseless carriage. The vehicles were crude affairs, propelled principally by steam and electricity. The rapid development of the A. C. A.'s shows is now a matter of interesting history.

Statistical History

On December 2, 1901, the A. C. A. opened its second show with ninety-two exhibitors. There was no show in 1902, but each year since has seen successful exhibitions with the following schedule:

Year	Place	Exhibitors
1903	Madison Square	198
1904	Madison Square	205
1905	Madison Square	247
1906	Armory	218
1906	Grand Central	216
1907	Grand Central	257
1908-09	Grand Central	286

Not only has the number of exhibitors increased from sixty-nine to 286, but the attendance has been tremendous, which means that shows are a necessity, and a great business-getting proposition for the exhibitors.

The manufacturers who exhibit meet practically every live dealer who goes to the shows from the most remote parts of the country. Dealers meet the buying public, make new acquaintances and secure the names and addresses of those who are really interested and intend to purchase. All this can be accomplished in no other way at so small a cost.

Carriage Dealers Attracted

Shows have been the direct cause of changing many carriage dealers to the ranks of motor car distributors. Carriage dealers of every country are seeing the hand-writing on the wall and the inevitable downfall of the horse. During the past season there has been a scramble among carriage dealers throughout the country for motor car agencies.

Specifications of the Cars

MAKE	MODEL	BODY		MOTOR		COOLING		IGNITION			
		Price	H. P.	Type	Seats	Cylinders	Bore	Stroke	Radiator	Pump	Magneto	Battery	Lubrication

CARS COSTING													
Reo	G	\$500	10	Runabout	1	4%	6	Tubular	Gear	Dry	Pump		
Maxwell	A	500	10	Runabout	1	4	4	H'ycomb	Ther.	Dry			
Brush	B	550	7	Runabout	1	4	4	H'ycomb	Ther.	Dry			
Brush	B	550	7	Runabout	1	4	4	H'ycomb	Ther.	Dry			
Anderson	C	650	12	Runabout	1	4	4	H'ycomb	Ther.	Dry		F. F.	
Lambert	A-1	800	20	Runabout	2	2	5	4	H'ycomb	Ther.			
Maxwell	L-B	850	14	Runabout	2	2	4	4	H'ycomb	Ther.			
Ford	T	850	20	Touring	5	4	5	4	H'ycomb	Centr.	Magneto		
Jackson	F	850	16-18	Runabout	12	2	5	4	H'ycomb	Ther.	Dry		
Jackson	K	850	16-18	Touring	4	2	5	4	H'ycomb	Ther.	Dry		
Middleby	A or B	850	25	Optional	2	or 4	4	4	4	—Al	Splitdorf.	Dry	
Lambert	A-3	875	20	Runabout	4	2	5	4	H'ycomb	—Al	Dry		
Cameron	14	900	20-24	Runabout	4	3	4	3	4	—Al	Remy	Dry	Gear
Ford	T	950	20	Coupe	5	4	4	3	4	—Al	Magneto	Dry	
Cameron	14	950	20-24	Roadster	5	4	4	3	4	—Al	Remy	Dry	Gear
Cameron	15	1000	20-24	Runabout	2	4	3	4	3	—Al	Remy	Dry	
Mitchell	J	1000	20	Runabout	2	4	4	4	4	—Al	Remy	Dry	
Reo	H-R	1000	20-22	—	4	4	4	4	4	—Al	Remy	Dry	
Reo	D	1000	20-22	—	4	4	4	4	4	—Al	Remy	Dry	
Cartercar	H	1000	18-20	Runabout	4	2	4	4	4	—Al	Remy	Dry	
Ford	T	1000	20	Town Car	5	4	4	4	4	—Al	Magneto	Dry	
Ford	T	1000	20	Runabout	5	4	4	4	4	—Al	Magneto	Dry	
Ford	T	1000	20	Roadster	5	4	4	4	4	—Al	Magneto	Dry	
Ford	T	1000	20	Tourabout	4	4	4	4	4	—Al	Magneto	Dry	

CARS COSTING BE													
Cameron	16	1100	20-24	Roadster	4	4	3	3	3	—Al	Remy	Dry	
Cameron	16	1100	20-24	Touring	5	4	3	3	3	—Al	Remy	Dry	
Oakland	20-A	1200	20	—	3	2	4	2	2	Tubular	Magneto	Stor.	F. F.
Oakland	20-R	1250	20	—	4	2	4	2	2	Tubular	Magneto	Stor.	F. F.
Oakland	20-C	1250	20	—	4	2	4	2	2	Tubular	Magneto	Stor.	F. F.
Regal	B	1250	30	Runabout	4	4	4	4	4	Tubular	Magneto	Stor.	Pump
Regal	A	1250	30	Touring	5	4	4	4	4	Tubular	Magneto	Stor.	Pump
Overland	30	1250	30	Runabout	4	4	4	4	4	Tubular	Remy	Dry	F. F.
Jackson	C	1250	20-24	Touring	5	2	5	4	4	H'ycomb	Magneto	Stor.	
Atlas (Two Cycle)	R	1250	22	Runabout	2	4	4	4	4	Tubular	Magneto	Stor.	
Lambert	27	1250	28	—	4	4	4	4	4	H'ycomb	—Al	Stor.	
Lambert	30	1250	28	—	5	4	4	4	4	H'ycomb	—Al	Stor.	
Black	40	1250	40	Touring	5	4	4	4	4	—Al	Magneto	Dry	Mech.
Overland	30	1300	30	Runabout	4	4	4	4	4	Tubular	Remy	Stor.	F. F.
Maxwell	Dr	1350	20	Runabout	2	5	5	5	5	H'ycomb	Magneto	Stor.	
Cartercar	K	1350	22-24	Touring	5	2	5	4	4	Tubular	Ther.	Dry	
Cartercar	G	1350	22-24	Roadster	4	2	5	4	4	Tubular	Ther.	Dry	
Kissel Kar	LD9	1350	30	Roadster	5	4	4	4	4	Tubular	Remy	Dry	Mech.
Overland	31	1400	30	Optional	5	4	4	4	4	Tubular	Remy	Dry	Force
Maxwell	HD	1450	20	Touring	5	2	5	4	4	H'ycomb	Magneto	Stor.	
Overland	32	1500	32	Runabout	4	4	4	4	4	Tubular	H. T. Mag.	Stor.	F. F.
Overland	32	1500	32	Toy Ton.	5	4	4	4	4	Tubular	H. T. Mag.	Stor.	F. F.
Overland	32	1500	32	Touring	5	4	4	4	4	Tubular	H. T. Mag.	Stor.	Mech.
Kissel Kar	LD9	1500	30	Baby Ton.	5	4	4	4	4	Tubular	Remy	Dry	Mech.
Kissel Kar	LD9	1500	30	Touring	5	4	4	4	4	Tubular	Remy	Dry	Mech.
Mitchell	K	1500	28-30	Def. Ton.	5	4	4	4	4	H'ycomb	Magneto	Stor.	
Pullman	L	1500	20	Runabout	3	4	3	3	3	Tubular	Magneto	Stor.	
Stoddard-Dayton	9-H	1500	25	Runabout	2 or 3	4	3	3	3	H'ycomb	Magneto	Stor.	
Cameron	11	1500	36	Roadster	3	6	3	3	3	—Al	Remy	Dry	Gear
Cameron	11	1500	36	Touring	5	6	3	3	3	—Al	Remy	Dry	Gear
Moline	M	1500	24	Touring	5	6	3	3	3	—Al	Remy	Dry	Gear
Gearless	35	1500	35	Optional	4 or 5	4	4	4	4	H'ycomb	Splitdorf.	Stor.	

CARS COSTING BE													
Oakland	40F	1600	40	—	2	4	4	5	5	Tubular	Optional	Stor.	
Oakland	40H	1600	40	—	4	4	4	5	5	Tubular	Optional	Stor.	
Oakland	40G	1600	40	—	5	4	4	5	5	Tubular	Optional	Stor.	
Jackson	H	1600	30	Roadster	4	4	4	4	4	H'ycomb	Ther.	Magneto	Stor.
Jackson	H	1600	30	Touring	5	4	4	4	4	H'ycomb	Ther.	Magneto	Stor.
Gearless	Olympic	1650	35	Optional	4 or 5	4	4	4	4	H'ycomb	—Al	Splitdorf.	
Maxwell	KA	1750	24-30	Runabout	3	4	4	4	4	H'ycomb	Magneto	Stor.	
Maxwell	DA	1750	24-30	Touring	4	4	4	4	4	H'ycomb	Magneto	Stor.	
Lambert	19	1750	35-40	—	4	4	4	4	4	H'ycomb	Ther.	H. T. Mag.	Stor.
Interstate	25	1750	35-40	Optional	4	4	4	4	4	H'ycomb	Ther.	H. T. Mag.	Stor.
Barnes	1750	25-30	Roadster	2 or 3	6	3	3	4	4	Tubular	Elsemann	Coll.	Pump
Lane Steamer	14	1800	20	Runabout	3	2	4	4	4	Tubular	Extra	Dry	Splsh
Barnes	1800	25-30	Roadster	4	6	3	4	4	4	Tubular	Centr.	Dry	Pump
McCue	1800	25-30	Runabout	5	4	4	4	4	4	Tubular	Centr.	Dry	Pump
Midland	E	1800	25-30	Toy Ton.	4	4	4	4	4	Tubular	Remy	Dry	Mech.
Kissel Kar	L	1800	30	Coupe	4	4	4	4	4	Tubular	Centr.	Kent	
Atlas (Two cycle)	L-D-9	1800	30	Runabout	2 or 3	4	3	4	4	Tubular	Centr.	Dry	Pump
Atlas (Two cycle)	F	1800	33	Runabout	4	6	3	4	4	Tubular	Centr.	Dry	Pump
Barnes	1850	25-30	Toy Ton.	4	6	3	4	4	4	Tubular	Centr.	Dry	Pump
Mora	Light Four	1850	24-28	Bacystyle	4	4	4	4	4	Tubular	Centr.	Atwater.	
Atlas (Two cycle)	F	1850	33	Touring	5	3	4	4	4	Tubular	Magneto	Stor.	
Jackson	E	2000	35	Roadster	4	4	4	4	4	H'ycomb	Magneto	Stor.	
Jackson	E	2000	35	Touring	5	4	4	4	4	H'ycomb	Magneto	Stor.	
Lane Steamer	15	2000	20	Touring	5	2	4	4	4	Tubular	Centr.	Atwater.	
Stoddard-Dayton	9-C	2000	35	Roadster	4	4	4	5	5	Tubular	Magneto	Stor.	
Stoddard-Dayton	9-A	2000	35	Touring	5	4	4	5	5	Tubular	Magneto	Stor.	
Pullman													

at the Grand Palace Show

Promoting a Show
By Alfred Reeves

Gulated	TRANSM'N		CONTROL		WHEEL		Frame	BEARINGS		TIRES				
	Type	Speeds	Drive	Brakes	Steering	Base	Track	Motor	Trans-mission	Axle	Weight	Front	Rear	
\$1,000 OR LESS														
Disk	Plan.	2	Chain	2	Worm & Sec.	78	56	Pres'd Steel				28x3	28x3	
Disk	Plan.	2	Shaft	2	Pin'n & Seg.	82	56	Pres'd Steel			1100	28x3	28x3	
Disk	Plan.	2	Chain	2	Wood	74	56	Wood			900	28x3	28x3	
Disk	Plan.	2	Chain	2	Wood	74	56	Wood			900	32x2	32x2	
Disk	Plan.	3	Chain	70	56						900	30x3	30x3	
Frle.	...	Chain	2	Screw & Nut	95	56	Pres'd Steel				1250	30x3	30x3	
Disk	Plan.	2	Shaft	2	Pin'n & Seg.	84	56	Pres'd Steel			1150	30x3	30x3	
Disk	Plan.	2	Chain	2	Irreversible	100	56	Pres'd Steel			1200	30x3	30x3	
Disk	Plan.	2	Shaft	2	Pres'd Steel	96	56	Pres'd Steel			1600	30x3	30x3	
Disk	Plan.	2	Shaft	2	Pres'd Steel	96	56	Pres'd Steel			1600	30x3	30x3	
Cone	Prog.	3	Shaft	4	Irreversible	108	56	Arm'd Wood	White Br.	Wh. Br.	Roller	1750	32x3	32x3
Fric.	...	Chain	2	Screw & Nut	95	56	Pres'd Steel				1400	30x3	30x3	
Cone	Selec.	3	Shaft	4	Rack & Pin.	96	56	Steel	P. White Br.	Ball	Ball	1200	30x3	30x3
Disk	Plan.	2	Shaft	3	Irreversible	100	56	Pres'd Steel			1200	30x3	30x3	
Cone	Selec.	3	Shaft	4	Rack & Pin.	96	56	Steel	P. White Br.	Ball	Ball	1225	30x3	30x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	92	56	Steel	P. White Br.	Ball	Ball	1100	32x3	32x3
Cone	Selec.	3	Shaft	4	Irreversible	92	56	Pres'd Steel			1700	32x3	32x3	
Disk	Plan.	2	Chain	3	Worm & Sec.	96	56	Pres'd Steel			1100	32x3	32x3	
Disk	Plan.	2	Chain	3	Worm & Sec.	96	56	Pres'd Steel			1100	32x3	32x3	
Fric.	...	Chain	3	Plion & Sec.	94	56	Pres'd Steel				1225	30x3	30x3	
Disk	Plan.	2	Shaft	3	Irreversible	100	56	Pres'd Steel				1400	30x3	30x3
Disk	Plan.	2	Shaft	3	Irreversible	100	56	Pres'd Steel			1100	30x3	30x3	
Disk	Plan.	2	Shaft	3	Irreversible	100	56	Pres'd Steel			1100	30x3	30x3	
Disk	Plan.	2	Shaft	3	Irreversible	100	56	Pres'd Steel			1200	30x3	30x3	
TWEEN \$1,000 AND \$1,500														
Cone	Selec.	3	Shaft	4	Rack & Pin.	100	56	Steel	P. White Br.	Ball	Ball	1350	30x3	30x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	100	56	Steel	P. White Br.	Ball	Ball	1400	30x3	30x3
Disk	Plan.	2	Shaft	4	Epicyclic	100	56	Pres'd Steel			1700	32x3	32x3	
Disk	Plan.	2	Shaft	4	Epicyclic	100	56	Pres'd Steel			1740	32x3	32x3	
Disk	Plan.	2	Shaft	4	Epicyclic	100	56	Pres'd Steel			1720	32x3	32x3	
Cone	Selec.	3	Shaft	4	Worm & Nut	105	56	Pres'd Steel	Ball.	Roller	Roller	1700	32x3	32x3
Cone	Selec.	3	Shaft	4	Worm & Nut	105	56	Pres'd Steel	Ball.	Roller	Roller	1900	32x3	32x3
Cone	Plan.	2	Shaft	4	Worm & Sec.	108	56	Pres'd Steel	White Br.	Hyatt	Hyatt	1600	32x3	32x3
Disk	Plan.	2	Chain	3	Chain	104	56	Pres'd Steel	As.			2000	32x3	32x3
Band	Sld.	2	Shaft	2	"Gemmer"	90	56				1500	30x3	30x3	
Frle.	...	Chain	2	Screw & Nut	110	56	Pres'd Steel				1500	30x3	30x3	
Frle.	...	Chain	2	Screw & Nut	110	56	Pres'd Steel			1600	30x3	30x3		
War.	Sld.	3	Shaft	4	Wheel	112	56	Steel	Bronze	Roller	Roller	1750	38	38
Cone	Plan.	2	Shaft	4	Worm & Sec.	105	56	Pres'd Steel	White Br.	Hyatt	Hyatt & Ball	1730	32x3	32x3
Disk	Plan.	2	Shaft	4	Pin'n & Seg.	96	56	Pres'd Steel			1700	30x3	30x3	
Frle.	...	Chain	3	Pin'n & Sec.	103	56	Pres'd Steel				32x3	32x3	32x3	
Frle.	...	Chain	3	Pin'n & Sec.	103	56	Pres'd Steel				32x3	32x3	32x3	
Cone	Selec.	3	Shaft	4	Worm & Sec.	107	56	Steel	White Metal	Timken	Timken	2000	32x3	32x3
Cone	Plan.	2	Shaft	4	Worm & Sec.	110	56	Pres'd Steel	White Br.	Hyatt	Hyatt & Ball	1600	34x3	34x3
Disk	Plan.	2	Shaft	4	Pin'n & Sec.	96	56	Pres'd Steel			1700	30x3	30x3	
Cone	Selec.	3	Shaft	4	Worm & Sec.	110	56	Pres'd Steel	White Br.	Ball	Ball	1950	34x3	34x3
Cone	Selec.	3	Shaft	4	Worm & Sec.	110	56	Pres'd Steel	White Br.	Ball	Ball	2000	34x3	34x3
Cone	Selec.	3	Shaft	4	Worm & Sec.	110	56	Pres'd Steel	White Br.	Ball	Ball	2100	34x3	34x3
Cone	Selec.	3	Shaft	4	Worm & Sec.	107	56	Steel	White Metal	Timken	Timken	2000	32x3	32x3
Cone	Selec.	3	Shaft	4	Worm & Sec.	107	56	Steel	White Metal	Timken	Timken	2000	34x3	34x3
Cone	Selec.	3	Shaft	4	Irreversible	105	56	Pres'd Steel				2300	32x4	32x4
Cone	Selec.	3	Shaft	4	Irreversible	102	56	Pres'd Steel				1750	32x3	32x3
Cone	Selec.	3	Shaft	4	Worm & Nut	103	56	Pres'd Steel				1700	32x3	32x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	1600	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	1625	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	1650	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	1700	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	1750	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	1800	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	1850	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	1900	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	1950	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2000	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2050	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2100	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2200	34x3	34x3
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2250	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2300	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2350	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2400	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2450	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2500	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2550	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2600	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2650	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2700	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2750	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2800	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2850	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2900	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	2950	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	3000	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	3050	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	3100	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	3150	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	3200	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	3250	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	3300	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	3350	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball	Ball	3400	32x4	32x4
Cone	Selec.	3	Shaft	4	Rack & Pin.	112	56	Steel	P. White Br.	Ball</				

A clean-cut system must be in vogue for some months prior to the show to handle the preliminaries and a most exacting one to look after the comfort of the exhibitors and visitors during the progress of the affair. Some 9 months ago the first plans for the Grand Central palace show were laid when Benjamin Briscoe, chairman of the American Motor Car Manufacturers' Association appointed the show committee. The men selected as directors of the affair were H. O. Smith, chairman; R. M. Owen and S. H. Mora, with the addition of E. R. Hollander, representing the Importers Automobile Salon, and D. J. Post of the Motor and Accessory.

Publicity Campaign Necessary

After surveying the palace, diagrams were issued, contract and space applications prepared and the whole distributed throughout the motor trade. This was followed by the plans for advertising, an essential part of an exhibition depending upon public support. Poster designs were submitted, the approved ones were printed and arrangements made for their distribution on billboards within 50 miles of New York city hall, many of the posters being illuminated by electric lights. Then followed the advertising in the daily newspapers and the motor papers, running into many thousands of dollars and the handling of the publicity end which supplies the news regarding the show plans.

Most important of all contracts made was the one for decorations which in this case went to the S. R. Ball Co. of New York whose design was considered the most original and best adapted to the palace and to motor cars. The printing of thousands of pieces of stationery of all sorts, the arrangements for the shipping to New York of the products of 300 motor car and accessory factories and the printing of some 200,000 tickets of all styles came in for consideration.

Lots of Detail Work

Following the applications for space and the drawing and the signing of contracts, the matter of plans for the care of agents during the show had to be given consideration, together with the annual show luncheon and the meetings that are always on schedule during show week. Some time prior to the show the regular departments for handling the affair were organized with a head to each, the whole being in charge of the general manager under the guidance of the show committee of the American Motor Car Manufacturers' Association.

As the show must open on time, everything must be scheduled and carried out without delays of any moment. Four or 5 days before the show opened the palace was turned over to an army of workmen who proceeded to transform it in a manner that is astonishing to the layman. Included in this vast corps of help were carpenters, carpet layers, artists, drapers, sculptors, plaster workers, modelers, telephone operators, linemen, wiremen, furniture makers, brass workers, scene painters, iron workers, telegraph operators, sign

Specifications of the Cars

MAKE	MODEL	Price	H. P.	BODY		MOTOR		COOLING		IGNITION	
				Type	Seats	Cylinders	Bore	Stroke	Radiator	Pump	Magneto

CARS COSTING BETWEEN											
Kissel Kar.	D-9	2000	40	Roadster	4	4	4%	4%	Tubular	Remy	Dry Mech.
Kissel Kar.	D-9	2000	40	Baby Ton.	4	4	4%	4%	Tubular	Remy	Dry Mech.
Kissel Kar.	D-9	2000	40	Touring	5	4	4%	4%	Tubular	Remy	Dry Mech.
McCue	2000	30	Roadster	4	4	4%	4%	Tubular	Magneto	Dry Mech.	

CARS COSTING BETWE											
Pennsylvania.	D-25	2100	28.9	Touring	4	4	4%	4%	H'ycomb	Magneto	.....
Pennsylvania.	D-25	2100	28.9	Touring	5	4	4%	4%	H'ycomb	Magneto	.....
McCue.	2200	30	Touring	6	4	4%	4%	Tubular	Magneto	Dry Mech.	
Midland.	G	2250	30-35	Optional	4	4	4%	5%	Tubular	Magneto	Dry Mech.
Kissel Kar.	D-9	2300	40	Close C'pld	4	4	4%	4%	Tubular	Remy	Dry Mech.
Marmon.	32	2400	32-40	Runabout	4	4	4%	4%	Cellular	H. T. Mag.	Stor.
Marmon.	32	2400	32-40	Runabout	5	4	4%	4%	Cellular	H. T. Mag.	Stor.
Marmon.	32	2400	32-40	Touring	4	4	4%	4%	Cellular	H. T. Mag.	Stor.
Premier.	30	2500	30-35	Runabout	4	4	4%	4%	Cellular	.....	Stor.
Premier.	30	2500	30-35	Touring	5	4	4%	4%	Cellular	.....	Stor.
Stoddard-Dayton.	9-K	2500	45	Runabout	4	4	4%	5	Tubular	Magneto	Stor.
Stoddard-Dayton.	9-F	2500	45	Runabout	5	4	4%	5	Tubular	Magneto	Stor.
Acme.	XIX	2500	25	Runabout	2	4	4%	5	Tubular	Magneto	Stor.
Atlas (Two-cycle)	T	2500	22	Town Car	5	2	4	4%	Cellular	.....	.....
Speedwell.	M-C	2500	40	Roadster	3	4	4%	5	H'ycomb	Bosch	Sp'lsh
Kissel Kar.	M-D	2500	40	Touring	7	4	4%	5	H'ycomb	Bosch	Sp'lsh
Kissel Kar.	G-9	2750	60	Roadster	6	4	4%	4%	Tubular	Centr.	Dry Mech.
Kissel Kar.	G-9	2750	60	Baby Ton.	6	4	4%	4%	Tubular	Centr.	Dry Mech.
Kissel Kar.	G-9	2750	60	Touring	5	4	4%	4%	Tubular	Centr.	Dry Mech.
National.	9-35	2750	35	Optional	4	4	4%	4%	Special	Gear	Bosch
Mora.	Large Four	2750	60	Racytype	4	4	6	6	Tubular	Magneto	Stor.
Mora.	Large Four	2750	60	Touring	5	4	6	6	Tubular	Magneto	Stor.
Pullman.	6-30	2750	30	Runabout	3	6	3%	3%	Tubular	Magneto	Dry Stor.
Gearless.	50	2750	50	Touring	5	4	5	5%	H'ycomb	Magneto	Stor.
Rockwell.	.....	2750	20	Taxi	5	3	3%	4%	.....	.....	Pump Sp'lsh
Lane Steamer.	16	2800	30	Roadster	5	3	3%	4%	.....	.....	.....
Austin.	45	2850	45	Runabout	6	4	4%	4%	Cellular	Magneto	Stor.
Pullman.	4-40	3000	40	Runabout	5	4	5	5%	Tubular	Bosch	Dry Stor.
Austin.	45	3000	45	Touring	5	5	4%	4%	Cellular	Magneto	F. F.
Sultan.	.....	3000	10-12	Landaulet	6	4	3%	4%	Tubular	Bosch	.....
Pennsylvania.	C	3000	36	Runabout	4	4	4%	5%	Mayo	Magneto	.....
Pennsylvania.	C	3000	36	Touring	5	4	4%	5%	Mayo	Magneto	.....
Kissel Kar.	G-9	3000	60	Touring	7	6	4%	4%	Tubular	Centr.	Dry Mech.
Moon.	C	3000	30-35	Runabout	4	4	4%	4%	H'ycomb	Centr.	F. F.
Moon.	C	3000	30-35	Toy Ton.	4	4	4%	4%	H'ycomb	Centr.	F. F.
Moon.	C	3000	30-35	Touring	5	4	4%	4%	H'ycomb	Centr.	F. F.
Lane Steamer.	18	3000	30	Close C'pld	4	2	.....	.....	.....	.....	Sp'lsh

CARS COSTING BETWE											
Lane Steamer.	17	3100	30	Touring	7	2	4%	4%	Tubular	Gear	.....
Kissel Kar.	D-9	3200	40	Limousine	5	4	4%	4%	Tubular	Remy	Dry Mech.
Kissel Kar.	G-9	3250	60	Coupe	.....	6	4%	4%	Tubular	Bosch	Dry Mech.
Gearless.	.....	3250	30-60	Optional	3	7	4%	5%	H'ycomb	Magneto	Stor.
Mora.	Light Six	3500	42-50	Racytype	3	6	4	5%	Tubular	Magneto	Stor.
Gaeth.	XX	3500	38	Close C'pld	5	4	4%	5%	H'ycomb	Ther.	.....
Gaeth.	XX	3500	38	Touring	4	4	4%	5%	H'ycomb	Ther.	.....
Gaeth.	XX	3500	38	Touring	7	4	4%	5%	H'ycomb	Ther.	.....
Marmon.	45	3500	45-50	Runabout	4	4	5	5%	Cellular	H. T. Mag.	Stor.
Premier.	45	3500	45-55	Runabout	4	6	4%	4%	Cellular	Bosch	Stor.
Premier.	45	3500	45-55	Touring	7	6	4%	4%	Cellular	Bosch	Stor.
Pullman.	M	3500	40	Touring	7	4	5	5%	Tubular	Bosch	Dry
Acme.	XXVI	3500	30	Touring	5	4	4%	5%	Tubular	H. T. Mag.	Stor.
Acme.	XXVI	3500	30	Touring	5	4	4%	5%	Tubular	H. T. Mag.	Stor.
Speedwell.	M-E	3500	40	Limousine	7	4	4%	5%	H'ycomb	Bosch	Dry
Moon.	D	3500	30-35	Touring	7	4	4%	4%	H'ycomb	Magneto	Stor.
Mora.	.....	3600	.....	Touring	5	6	4	5%	Tubular	Magneto	Stor.
Acme.	XXVII	3700	35	Touring	7	4	5	5	Tubular	H. T. Mag.	Stor.
National.	9-40	3700	40	Touring	7	4	5	5	Tubular	Gear	.....
Marmon.	50	3750	60-60	Close C'pld	4	4	5%	5%	Cellular	H. T. Mag.	Stor.
Marmon.	50	3750	60-60	Touring	7	4	5%	5%	Cellular	H. T. Mag.	Stor.
Mora.	.....	3750	42-50	Roadster	4	6	4	5%	Tubular	Magneto	Stor.
American.	.....	3750	50	Roadster	3	4	5%	5%	.....	.....	.....
American.	50	3750	50	Runabout	3	4	5%	5%	Tubular	Magneto	Stor.
Austin.	50	3750	60-60	Touring	7	4	5%	5%	Tubular	Magneto	Stor.
Pennsylvania.	E	3800	36-38	Touring	7	4	4%	5%	Mayo	Magneto	Stor.
Austin.	45	3850	45-50	Limousine	5	6	4%	4%	Tubular	Magneto	Stor.
Moon.	D	3850	32	Town Car	5	4	4%	4%	H'ycomb	Centr.	.....
American.	40	3850	32	Runabout	4	4	5%	5%	H'ycomb	Bosch	.....
American.	4000	4000	50	Touring	7	4	5%	5%	H'ycomb	Centr.	H. T. Mag.
Austin.	50	4000	50-60	Touring	7	4	5%	5%	Tubular	Magneto	Stor.
American Simplex (2-cy.)	D	4000	40	Runabout	2	3	4%	5%	Tubular	Centr.	H. T. Mag.
American Simplex (2-cy.)	D	4000	50	Touring	5 or 7	4	5	5	Tubular	Centr.	H. T. Mag.

CARS COSTING BETWE											
National.	9-50	4200	50	Touring	7	6	4%	4%	H'ycomb	Centr.	Bosch
Moon.	D	4250	32	Brevette	5	4	4%	4%	H'ycomb	Centr.	Bosch
Gaeth.	XX	4500	38	Limousine	7	4	4%	5%	H'ycomb	Ther.	Magneto
Acme.	XXI	4500	48	Runabout	4	6	4%	5%	Tubular	.....	H. T. Mag.
Acme.	XX	4500	48	Touring	6	4	4%	5%	Tubular	.....	H. T. Mag.
Welch.	4-M	4500	50	Runabout	5	4	4%	5	H'ycomb	.....	Bosch
Welch.	4-O	4500	50	Close C'pld	6	4	4%	5%	H'ycomb	.....	Bosch
Welch.	4-L	4500	50	Touring	7	4	4%	5%	H'ycomb	.....	Bosch
Austin.	.....	4750	60-60	Roadster	3	6	5%	5%	Tubular	Magneto	Stor.
Austin.	.....	5000	50-60	Optional	5 or 7	4	5	5%	Tubular	Eisemann	Stor.
National.	9-60	5000	60	Touring	7	6	5	5	.....	Gear	.....
American.	.....	5000	50	Limousine	.....	4	5%	5%	.....	Bosch	Stor.
Austin.	.....	5000	50-60	Limousine	7	4	5%	5%	Tubular	Magneto	Stor.
Austin.	.....	5000	60-60	Touring	7	6	5%	5%	Tubular	Magneto	Stor.
American Simplex (2-Cy.)	D	5000	50	Limousine	7	4	5	5	Tubular	Centr.	H. T. Mag.

at the Grand Palace Show

Clutch	TRANSM'N		CONTROL		WHEEL		Frame	BEARINGS			TIRES	
	Type	Speeds	Drive	Brakes	Steering	Base	Track	Motor	Trans-mission	Axle	Weight	Front	Rear

\$1,500 AND \$2,000—Continued

Cone	Select.	3 Shaft	Worm & Sec.	116	56	Steel	White Metal	Timken	Timken	2600	36x3½	36x4
Cone	Select.	3 Shaft	Worm & Sec.	115	56	Steel	White Metal	Timken	Timken	....	36x3½	36x4
Cone	Select.	3 Shaft	Worm & Sec.	115	56	Steel	White Metal	Timken	Timken	....	36x3½	36x4
Cone	Select.	3 Shaft	Worm	116	56	Pres'd Steel	Plain	Timken	Ball	2020	36x4	36x4

EN \$2,000 AND \$3,000

Cone	Select.	3 Shaft	Worm & Sec.	110	56½	Pres'd Steel	.....	.....	.....	2350	32x4	32x4
Cone	Select.	3 Shaft	Worm & Sec.	110	56½	Pres'd Steel	Plain	Ball	Ball	2400	32x4	32x4
Cone	Select.	3 Shaft	Worm	116	56	Pres'd Steel	.....	.....	.....	2200	36x4	26x4
Disk	Select.	3 Shaft	Screw & Nut	112	56	Pres'd Steel	.....	.....	.....	2650	34x4	34x4
Cone	Select.	3 Shaft	Worm & Sec.	115	56	Steel	White Metal	Timken	Timken	2300	36x3½	36x4
Exp.	Select.	3 Shaft	Screw & Nut	112	56	Pres'd Steel	.....	.....	.....	1975	24x3½	34x3½
Exp.	Select.	3 Shaft	Screw & Nut	112	56	Pres'd Steel	.....	.....	.....	1975	34x3½	34x3½
Disk	Select.	3 Shaft	Worm & Nut	114	56½	Pres'd Steel	.....	.....	.....	1975	34x3½	34x3½
.....	Select.	3 Shaft	Worm & Nut	120	66½	Pres'd Steel	.....	.....	.....	2600	34x3½	34x4
Cone	Select.	3 Shaft	Worm & Nut	120	56	Pres'd Steel	.....	.....	.....	2650	34x4	34x4
Cone	Select.	3 Shaft	Worm & Nut	113½	56½	Pres'd Steel	.....	.....	.....	2700	34x4	34x4
Cone	Select.	3 Shaft	Screw & Nut	96	56	Pres'd Steel	.....	.....	.....	3000	34x4	34x4
Band	Slid.	3	Irreversible	100	56	P.S. or Wood	.....	.....	.....	....	34x4	34x4
Cone	Select.	3 Shaft	Worm & G'r	120	56	Pres'd Steel	P. White Br.	Timken	Timken	2400	34x4	34x4
Cone	Select.	3 Shaft	Worm & Gr.	120	56	Pres'd Steel	P. White Br.	Timken	Timken	2700	34x4	34x4
Cone	Select.	3 Shaft	Worm & Sec.	130	56	Steel	White Metal	Timken	Timken	3100	36x4	36x4½
Cone	Select.	3 Shaft	Worm & Sec.	130	56	Steel	White Metal	Timken	Timken	....	36x4	36x4½
Cone	Select.	3 Shaft	Worm & Gr.	115	56½	Pres'd Steel	.....	.....	.....	2600	34x4	34x4
Cone	Select.	3 Shaft	Nut & Screw	118	56	Pres'd Steel	.....	.....	.....	2700	34x4	34x4
Cone	Select.	3 Shaft	Nut & Screw	118	56	Pres'd Steel	.....	.....	.....	2700	34x4	34x4
Ring	Gear.	3	Irreversible	104	56	Pres'd Steel	.....	.....	.....	1900	34x3½	36x3½
Disk	Select.	3 Shaft	Worm & Nut	106	53	Steel	.....	.....	.....	....	36x4	36x4½
.....	Select.	3 Shaft	Chain	112	56	Pres'd Steel	P. White Br.	N D Ball	N D Ball	3100	32x4	32x4
Disk	Select.	3 Shaft	Worm & Sec.	122	56½	Alloy Steel	.....	.....	.....	2250	36x3½	36x3½
Cone	Select.	3 Shaft	Irreversible	106	56	Pres'd Steel	.....	.....	.....	2300	36x4	36x4
Disk	Select.	3 Shaft	Worm & Sec.	122	56½	Alloy Steel	.....	.....	.....	2350	36x3½	36x3½
Disk	Prog.	3 Shaft	Worm & Sec.	98½	53½	Pres'd Steel	Plain	Ball	Ball	2400	32x4	32x4
Cone	Select.	3 Shaft	Worm & Nut	114	56½	Pres'd Steel	.....	.....	.....	2800	34x4	34x4½
Cone	Select.	3 Shaft	Worm & Nut	114	56½	Pres'd Steel	.....	.....	.....	2800	34x4	34x4½
Cone	Select.	3 Shaft	Worm & Sec.	130	56	Steel	White Metal	Timken	Timken	3100	36x4	36x4½
Disk	Select.	3 Shaft	Dble. Worm	112	56	Pres'd Steel	White Br.	Ball	Ball	2450	36x3½	36x4½
Disk	Select.	3 Shaft	Dble. Worm	112	56	Pres'd Steel	White Br.	Ball	Ball	2500	36x3½	36x4½
Disk	Select.	3 Shaft	Dble. Worm	112	56	Pres'd Steel	White Br.	Ball	Ball	2700	34x3½	34x4½
Disk	Select.	3 Shaft	Chain	125	56	Pres'd Steel	.....	.....	.....	3300	36x4	36x4

EN \$3,000 AND \$4,000

Cone	.....	Chain	3	.....	119	56	Pres'd Steel	Roller	.....	3400	36x4	36x4½
Cone	Select.	3 Shaft	Worm & Sec.	115	56	Pres'd Steel	White Metal	Timken	Timken	....	36x3½	36x4
Cone	Select.	3 Shaft	Worm & Sec.	130	56	Pres'd Steel	White Metal	Timken	Timken	3100	36x4	36x4½
Ring	Gear.	3	.....	124	56	Pres'd Steel	.....	.....	.....	2250	36x3½	36x3½
Cone	Select.	3 Shaft	Nut & Screw	105	56	Pres'd Steel	.....	.....	.....	2900	36x4	36x4½
Band	Prog.	3 Shaft	Irreversible	114	56	Pres'd Steel	.....	.....	.....	2500	36x3½	36x4
Cone	Select.	3 Shaft	Irreversible	114	56	Pres'd Steel	.....	.....	.....	3000	36x4	36x4½
Band	Prog.	3 Shaft	Irreversible	114	56	Pres'd Steel	.....	.....	.....	2900	36x4	36x4½
Disk	Select.	3 Shaft	Screw & Nut	114	56½	Pres'd Steel	.....	.....	.....	2520	34x4	34x4½
Disk	Select.	3 Shaft	Worm & Nut	124	56½	Pres'd Steel	.....	.....	.....	3150	34x4	34x4½
Disk	Select.	3 Shaft	Worm & Nut	124	56½	Pres'd Steel	.....	.....	.....	3000	36x4	36x4½
Cone	Select.	4 Shaft	Irreversible	119	56	Pres'd Steel	.....	.....	.....	3100	34x4	34x4
Cone	Prog.	3 Chain	Screw & Nut	102	56	Pres'd Steel	.....	.....	.....	3100	34x4	34x4
Cone	Select.	3 Shaft	Screw & Nut	102	56	Pres'd Steel	.....	.....	.....	3100	34x4	34x4
Cone	Select.	3 Shaft	Worm & Gr.	120	56	Pres'd Steel	P. White Br.	Timken	Timken	3200	34x4	34x5
Disk	Select.	4 Shaft	Dble. Worm	121	56	Pres'd Steel	White Br.	Ball	Ball	3100	36x3½	36x4½
Disk	Select.	3 Shaft	Screw & Nut	115	56	Pres'd Steel	.....	.....	.....	2500	36x4	36x4
Cone	Select.	4 Chain	Screw & Nut	115½	56½	Pres'd Steel	.....	.....	.....	3200	36x4	36x4½
Cone	Select.	3 Shaft	Worm & G'r	125	56½	Pres'd Steel	.....	.....	.....	3000	36x4	36x4½
Disk	Select.	3 Shaft	Screw & Nut	118	56½	Pres'd Steel	.....	.....	.....	3400	36x4	36x5
Disk	Select.	3 Shaft	Screw & Nut	118	56½	Pres'd Steel	.....	.....	.....	3500	36x4	36x5
Cone	Select.	3 Shaft	Screw & Nut	115	56	Pres'd Steel	.....	.....	.....	2400	36x4	36x4
Cone	Select.	4 Shaft	Rack & Nut	110	56	Pres'd Steel	.....	.....	.....	2750	36x3½	36x4
Cone	Select.	4 Shaft	Rack & Nut	110	56	Pres'd Steel	.....	.....	.....	2800	36x4	36x4½
Disk	Select.	4 Shaft	Worm & Sec.	124	54½	P. A. Steel	.....	.....	.....	3200	36x4	36x4
Disk	Select.	3 Shaft	Doub. Worm	122	56½	Pres'd Steel	.....	.....	.....	3300	36x4	36x4½
Disk	Select.	3 Shaft	Worm & Sec.	122	54½	Alloy Steel	.....	.....	.....	2550	36x3½	36x4
Disk	Select.	4 Shaft	Pin'n & Nut	121	56	Pres'd Steel	P. White Br.	Ball	Ball	....	36x3½	36x4½
Cone	Select.	4 Shaft	Rack & Nut	124	56	Pres'd Steel	.....	.....	.....	2800	40x4	40x4
Disk	Select.	4 Shaft	Rack & Nut	124	54½	Pres'd Steel	.....	.....	.....	3000	36x4	36x5
Disk	Select.	4 Shaft	Worm & Sec.	124	54½	Alloy Steel	.....	.....	.....	3500	36x4½	36x4½
Disk	Select.	3 Shaft	Screw	110	56	Pres'd Steel	.....	.....	.....	3000	36x4	36x4½
Disk	Select.	3 Shaft	Screw	117	56	Pres'd Steel	.....	.....	.....	3300	36x4	36x5

painters, freight handlers, shipping clerks, laborers, ushers, ground glass workers, floor polishers, silk hangers, banner makers, and wood workers.

For seven days and nights the palace was turned into a veritable beehive of industry and to the layman it looked as if the show never could be ready on time. Order comes out of chaos, however, and when the whistle blows for the opening for the private view, the cleaners quickly dispose of the debris and the public marched through the aisles with comparatively little knowledge of the accomplishments required to provide them with an exhibition of their favorite machines.

Palace Becomes a City

After the doors open the palace becomes a city in itself, with a small army of employees to look after the public and exhibitors. The information bureau where out-of-town visitors and others ask for information requires veritable human encyclopedias to supply.

A complete telephone exchange is installed and begins work, wires going to almost every one of the 300 exhibitors whose names are printed in a special telephone directory. Telegraph and telephone booths are opened up and thousands of pieces of mail matter are received daily. There is a day and night force of special police in uniform as well as plain clothes men, to keep the palace clear of questionable characters. Then there are ticket sellers, ticket takers, counters, pages, watchers, demonstration chiefs and helpers, laborers, porters, electricians, program boys, cleaners, two chefs, waiters and watchmen. The band of twenty-five pieces under Professor Bent plays pleasing music and the English Inn is ready to supply food and refreshments to the multitude.

The executive offices of the show with its cashiers, bookkeepers, stenographers, department clerks and office boys, works religiously for the comfort of the exhibitors. The press department opens its doors and almost 400 newspaper men from all quarters of the globe are on hand to write of the great exposition, sending their stories to the prominent daily, weekly and monthly publications of this country and Europe.

Details Looked After

Sign painters, decorators and electricians are kept in attendance for the use of exhibitors who arrive late. The various parlors and lounging rooms are alive with maids and attendants and the building is patrolled by firemen and special deputies to prevent smoking and maintain order.

The flashing lights, searchlights, the 9,000 pearl incandescent lamps, the low murmur of voices, the music of the stringed orchestra, and the display of glittering and life-like machines all supply a picturesque scene that has few equals from a spectacular point of view.

After a week that is strenuous for everyone identified with the show in any way, the band plays "Home, Sweet Home", and the show is over.

Cone	Select.	3 Shaft	Worm & G'r	130	56½	Pres'd Steel	.....	.....	.....	3100	36x4½	36x4½
Disk	Select.	4 Shaft	Irreversible	114	56	Pres'd Steel	.....	.....	.....	3300	36x4	36x4½
Band	Prog.	3 Shaft	Worm & Sec.	125	56	Pres'd Steel	.....	.....	.....	3200	36x4	36x4½
Cone	Select.	4 Chain	Screw & Nut	126	56½	Pres'd Steel	.....	.....	.....	3100	36x4	36x4½
Disk	Select.	3 Shaft	Worm & Sec.	125	56	Pres'd Steel	.....	.....	.....	3300	36x4	36x4½
Disk	Select.	3 Shaft	Worm & Sec.	125	56	Alloy Steel	.....	.....	.....	3200	36x4	36x4½
Disk	Select.	4 Shaft	Worm & Sec.	134</								

Motor Car Tendencies

By Charles E. Duryea

JUST what the show at the Grand Central palace will reveal when it opens its doors on the last evening of this year cannot be definitely known till then. Makers enjoy springing surprises as much as other business men and some of the manufacturers with the most pronounced advances are saying the least about them just now. In fact one of the strongest arguments against an early show is the fact that many agents and dealers have goods still on hand which they wish to dispose of before the next models are shown. Certain it is, however, that the past year has been a productive one from the standpoint of the designer and engineer and that much advance has been made.

Fine Rigs at Medium Prices

The most marked movement of interest to buyers is the large number of fine vehicles at moderate prices. Well-equipped factories with their trained men are now able to produce goods of superior quality at much lower prices than ever before and the buying public will be correspondingly increased with every probability that the palace with its enormous floor space will be taxed to hold the crowds and the early visitors will be the ones to get the best attention and most pleasure.

In body design, the short handy town car with its closed coupled chassis will be found at many exhibits. Wheels larger than ever will be seen on every hand and will delight the pioneers who years ago stood for wheel sizes that were right. On the heavier vehicles the 36-inch wheel has become practically standard, while the 40-inch on the American does not look unduly large as did the 36-inch wheels of a few years ago. Tires have slightly increased in cross section in the long struggle to get that same reliability in this part of the vehicle that other parts of the motor car now give.

Body Hanging and Springs

In body hanging and spring design much ingenuity has been expended. The once all but universal semi-elliptic spring has been largely replaced by full-elliptic and three-quarter platforms which add very materially to the easy riding qualities of the rigs. Springs have been improved in unseen ways such as by the use of steels unknown a few years ago, which are capable of greater elasticity and longer life than ever was imagined by makers of the olden days.

The steady advance toward more cylinders with no limit in sight which a few years ago threatened to bring in vehicles with telescope driving attachment has ceased, and the pendulum is swinging back toward lighter and saner constructions more suited to the needs of the masses.

Specifications of the Cars

MAKE	MODEL	BODY		MOTOR		COOLIN&		IGNITION		Lubrication	
		Price	H. P.	Type	Seats	Cylinders	Bore	Stroke	Radiator	Pump	
Welch	5500	50	Optional	7	4	4%	5	H'ycomb		Bosch	Stor.
Welch	5500	50	Limousine	7	4	4%	5	H'ycomb		Bosch	Stor.
Chadwick	5500	60	Touring	Opt.	6	5	6	H'ycomb		Bosch	Dry
Austin	6000	60-90	Limousine	7	6	5%	5	Tubular		Magneto	Stor.
Welch	6000	75	Optional	6	4%	5	5	H'ycomb		Bosch	Stor.
Welch	6000	75	...	7	6	4%	5	H'ycomb		Bosch	Stor.
Acme	XXV	6000	60	Touring	7	6	5	Tubular		H. T. Mag.	Stor.
De Luxe	C	6250	50-60	Limousine	4	4	5	Tubular		Eisemann	Stor.
Chadwick		6500	...	...	...	...	...	...	...	Bosch	Stor.
Welch		7000	75	Optional	6	4%	5	H'ycomb		Bosch	Stor. f.

CARS COSTING

Black	12	450	14	Stanhope	2	2	4%	1%	—Al	r—	Dry	Mech.
Kiblinger	H	450	13-5	Runabout	2	2	4%	3%	—Al	r—	Dry	Spl'sh
Kiblinger	K	475	13-5	Runabout	2	2	4%	3%	—Al	r—	Dry	Spl'sh
Kiblinger	L	500	13-5	Runabout	2	2	4%	2%	—Al	r—	Dry	Spl'sh
Kiblinger	N	550	16	Runabout	2	2	4%	4%	—Al	r—	Dry	Spl'sh
Holsman	4	550	12-8	Runabout	2	2	4	4	—Al	r—	Dry	Mech.
Anderson	B	550	12	Runabout	2	2	4	4%	—Al	r—	Dry	F. F.
Black	115	575	20	Roadster	3	2	4%	4%	—Al	r—	Dry	Mech.
Kiblinger	NN	600	16	Roadster	4	2	4%	4%	—Al	r—	Dry	.....
Kiblinger	GG	600	16	Surrey	4	2	4%	4%	—Al	r—	Dry	.....
Black	118	650	20	Surrey	4	2	4%	4%	—Al	r—	Dry	Mech.
Holsman	5	600	12-8	.....	4	2	4%	4%	—Al	r—	Dry	Stor.
Kiblinger	P	675	16	.....	6	2	4%	4%	—Al	r—	Dry	.....
Schacht	K	680	18-20	Corning	6	2	4%	4%	Tubular	Gear:	Dry	Mech.
Holsman	9	700	12-8	.....	4	2	4%	4%	—Al	r—	Dry	Stor.
Holsman	10	750	12-8	Stanhope	2	2	4	4	—Al	r—	Dry	.....
Kiblinger	M	750	27	Delivery	4	4	4%	3%	—Al	r—	Dry	.....
Holsman	11	800	12-8	Surrey	4	4	4	4	—Al	r—	Dry	Stor.
Holsman	H-15	1000	20	Coupe	6	4	4%	4%	—Al	r—	Dry	Stor.
Black	40	1250	40	Touring	6	4	4%	4%	—Al	r—	Magneto	Mech.

HIGH WHEEL COSTING

Kiblinger	R	475	13-16	Mail Wag.	2	2	4%	4%	—Al	r—	Dry	Mech.
Brush		600	7	Delivery	2	2	4	4	—Al	r—	Dry	Stor.
Holsman	12	700	16	Delivery	2	2	4	4	—Al	r—	Dry	Stor.
Kiblinger	150	825	16	Delivery	2	2	4%	4%	—Al	r—	Dry	Stor.
Ford	T	950	20	Taxicab	4	4	3%	4	Centr.	Magneto	Dry	.....

COMMERCIAL COSTING

Hart-Kraft	A-0	1050	14	Chassis	1/2 Ton	2	4%	4%	—Al	r—	Ther.	Splittdorf
Hart-Kraft	A-1	1100	14	Delivery	1/2 Ton	2	4%	4%	—Al	r—	Ther.	Splittdorf
Hart-Kraft	A-2	1175	14	Delivery	1/2 Ton	2	4%	4%	—Al	r—	Ther.	Splittdorf
Hart-Kraft	A-3	1200	14	Delivery	1/2 Ton	2	4%	4%	—Al	r—	Ther.	Splittdorf
Maxwell	O-D	1400	20	Delivery	2	5	5	5	H'ycomb	Ther.	Magneto	Stor.
Grammu-Logan	Y	1160	25	Delivery	2	4	4	4	—Al	r—	Magneto	F. F.
American	T	1750	20	Delivery	1/2 Ton	4	4	4%	Cellular	Centr.	Stor.	Mech.
Grammu-Logan	V	2250	25	1/2 Tons	4	4	4	4	—Al	r—	Magneto	F. F.
Grabowsky	S	2300	25-30	1 Ton	5	5	5	5	H'ycomb	Ther.	H. T. Mag.	Stor.
Pullman		2500	20	Taxicab	4	4	3%	3%	Tubular	Centr.	Magneto	Stor.
Atlas (Two Cycle)		2500	20	Taxicab	6	4	4%	4%	Cellular	Centr.	Magneto	Stor.
Speedwell		2500	24	Truck	6	4	4	5	H'ycomb	Gear	Bosch	Dry
Grabowsky	200-A	2600	25-30	Bus	12	2	5	5	H'ycomb	Ther.	H. T. Mag.	Stor.
American	M	2750	35-40	1/2 Ton	6	4	4%	5	Cellular	Centr.	H. T. Mag.	F. F.
Grabowsky	420-A	2800	25-30	.....	6	4	5	5	H'ycomb	Ther.	H. T. Mag.	Stor.
American	E or M	3000	35-40	2 Ton, 16 ps	6	4	4%	5	Tubular	Centr.	H. T. Mag.	F. F.
Grabowsky		3000	25-30	Fire Police	6	5	5	5	H'ycomb	Ther.	H. T. Mag.	Stor.

CARS COSTING BETWE

Grabowsky	505-A	3050	25-30	2 Ton	12	2	5	5	H'ycomb	Ther.	H. T. Mag.	Stor.
Grammu-Logan	X	3500	45	3 Ton	12	2	5	5	H'ycomb	Ther.	Magneto	Dry
Manhattan		3750	50	2 Ton	12	2	5	5	H'ycomb	Centr.	Bosch	F. F.
American	L	3800	55	Truck	20	4	5	6	Tubular	Centr.	Stor.	F. F.
American	D	3800	55	Stage	20	4	5	6	Tubular	Centr.	Stor.	F. F.
Manhattan		4000	50	3 Ton Chas.	4	5	5	6	H'ycomb	Centr.	Bosch	F. F.

CARS COSTING BETWE

Manhattan	4250	50	3 Ton Exp.	12	2	5	5	H'ycomb	Centr.	Bosch	Dry	F. F.
Manhattan		4300	50	3 Ton Exp.	12	2	5	5	H'ycomb	Centr.	Bosch	Dry
Manhattan		4350	50	3 Ton Grcy.	12	2	5	5	H'ycomb	Centr.	Bosch	F. F.
Manhattan		4400	50	3 Ton Win.	12	2	5	5	H'ycomb	Centr.	Bosch	Dry
American	O	4500	65	5 Ton	12	2	5	5	Tubular	Centr.	Stor.	F. F.
Manhattan		4650	50	4 Ton	12	2	5	5	H'ycomb	Centr.	Bosch	Dry
Manhattan		4800	50	12 Passngr.	20	4	5	6				

at the Grand Palace Show

Clutch	TRANSM'N		CONTROL		WHEEL		BEARINGS			TIRES				
	Type	Speeds	Drive	Brakes	Steering	Base	Track	Frame	Motor	Trans-mission	Axle	Weight	Front	Rear
ABOVE \$5,000														
Dish	Selec.	3 Shaft	4 Worm & Sec.	125	56	Alloy Steel						3800	36x4½	36x4½
Dish	Selec.	3 Shaft	4 Worm & Sec.	125	56	Alloy Steel						3800	36x4½	36x4½
Exp. S.	4 Chain	3 Worm & Sec.	130	56	Pres'd Steel							3300	36x4	36x5
Dish	Selec.	4 Shaft	4 Worm & Sec.	134	54½	Alloy Steel						4000	36x4½	36x4½
Dish	Selec.	3 Shaft	4 Worm & Sec.	138	56	Alloy Steel						4000	36x5	36x5
Dish	Selec.	3 Shaft	4 Worm & Sec.	133	56	Alloy Steel						3450	36x4½	36x4½
Cone	Selec.	4 Chain	4 Screw & Nut	126	56½	Pres'd Steel						3500	36x4½	36x4½
Cone	Selec.	4 Shaft	4 Worm & Sec.	121	56	Alloy Steel						3900	36x5	36x5
Dish	Selec.	3 Shaft	4 Worm & Sec.	138	56	Alloy Steel						4400	36x5	36x5

TYPES

Dish	Plan.	2 Chain	2 Wheel	69	56	Steel	White Metal	Man. Br.	Plain	890	38	38	
Dish	Plan.	2 Chain	2 Wheel	69	56	Angle				1100	34x1½	34x1½	
Dish	Plan.	2 Chain	2 Wheel	69	56	Angle					34x1½	34x1½	
Dish	Plan.	2 Chain	2 Wheel	78½	56	Angle					34x1½	34x1½	
Dish	Plan.	2 Chain	2 Wheel	78½	56	Angle					34x1½	34x1½	
Fric.	Plan.	2 Cable	2 Lever	65	56-62	Steel Tube					1½	1½	
Plan.	Plan.	2 Chain	2 Worm	70	56-62					850	1¼	1¼	
Plan.	Plan.	2 Chain	2 Wheel	83	56	Steel	White Metal	Man. Br.	Plain	1020	36	36	
Dish	Plan.	2 Chain	2 Wheel	89	56	Angle					34x1½	34x1½	
Dish	Plan.	2 Chain	2 Wheel	78	56	Angle					34x1½	34x1½	
Dish	Plan.	2 Chain	2 Wheel	78	56	Steel	White Metal	Man. Br.	Plain	1250	38	38	
Dish	Plan.	2 Chain	2 Lever	65	56-62	Steel Tube					845	1½	1½
Dish	Plan.	2 Chain	2 Wheel	100	56	Angle					34x1½	34x1½	
Fric.	Plan.	2 Chain	2 Worm & Sec.	74	56-60		White Br.		Timken	1100	1¾	1¾	
Dish	Plan.	2 Chain	2 Lever	75	56-62	Steel Tube					930	1¾	1¾
Dish	Plan.	2 Cable	2 Lever	75	56-62	Steel Tube					940	1½	1½
Dish	Plan.	2 Chain	2 Wheel	100	56	Angle					34x1½	34x1½	
Fric.	Plan.	2 Chain	2 Lever	75	56-62	Steel Tube					1055	1½	1½
War. Slid.	3 Shaft	4 Wheel	80	56-62	Arm. Wood	Man. Bronze	Roller	Roller	Roller	1100	1¾	1¾	
Dish	Plan.	2 Shaft	3 Irreversible	100	56	Steel					1750	38	38

CARS

\$1,000 OR LESS

Dish	Plan.	2 Chain	2 Wheel	69	56	Angle					1¼	1¼	
Dish	Plan.	2 Chain	2 Wheel	74	56-60	Wood					950	32x2	32x2
Dish	Plan.	2 Chain	2 Lever	75	56-62	Steel Tube					1060	1¾	1¾
Dish	Plan.	2 Shaft	2 Chain	77	56	Angle					34x1½	34x1½	
Dish	Plan.	2 Shaft	3 Irreversible	100	56	Pres'd Steel					1350	30x3	30x3½

TWEEN \$2,000 AND \$3,000

Dish	Plan.	2 Chain	2 Wheel	90	56	Arm. Wood	Bronze		Roller	2000	36x2	36x2	
Dish	Plan.	2 Chain	2 Wheel	90	56	Arm. Wood	Bronze		Roller	2000	36x2	36x2	
Dish	Plan.	2 Chain	2 Wheel	90	56	Arm. Wood	Bronze		Roller	2000	36x2	36x2	
Dish	Slid.	3 Shaft	4 Pin'n & Seg.	90	56	Pres'd Steel				1700	30x3½	30x4	
Dish	Slid.	2 Chain	4	90	56½	Angle	Bronze				34x2	34x3	
Cone	Slid.	3 Chain	2 Wheel	102	56½	Arm. Wood	Bronze		Timken	1800	32x2½	32x2½	
Dish	Slid.	3 Chain	4	96	56½	Channel	Bronze		Timken	2700	34x3½	34x3½	
Cone	Plan.	2 Chain	3	102	56	Pres'd Steel				2900	3½	3½	
Cone	Slid.	3 Chain	2 Wheel	108	56½	Arm'd Wood	Bronze			2500	32x3	32x3	
Cone	Slid.	3 Shaft	3 Irreversible	102	56	Pres'd Steel				2200	30x4	30x4	
C. B. Slid.	3 Shaft	3 Irreversible	100	56	Pres'd Steel					2500	20x4	30x4	
Cone	Selec.	4 Shaft	4 Worm & Gr.	120	56	Pres'd Steel					3030	34x5	34x5
Cone	Plan.	2 Chain	3	102	56	Pres'd Steel					2900	3½	3½
Cone	Slid.	3 Chain	2 Wheel	112	56½	Arm'd Wood	Bronze		Roller	2900	36x4	36x5	
Cone	Plan.	2 Chain	3	102	56	Pres'd Steel					2900	3½	3½
Cone	Slid.	3 Chain	2 Wheel	112	56	Arm'd Wood	Bronze		Roller	2900	36x4	36x5	
Cone	Plan.	2 Chain	3	102	56	Pres'd Steel					2900	3½	3½

EN \$3,000 AND \$4,000

Cone	Plan.	2 Chain	4 Screw & Nut	127	56	Pres'd Steel					3400	4	4
Cone	Plan.	2 Chain	4 Screw & Nut	102	56	Pres'd Steel					2900	3½	3½
M. D. Slid.	3 Chain	4	120	60	60	Channel	Bronze				5000	36x5	36x3½
Cone	Selec.	3 Chain	4 Screw & Nut	126	68	Channel	White Br.		Timken	7000	36x4½	36x3	
Cone	Plan.	2 Chain	2 Wheel	118	62	Arm'd Wood	Bronze		Timken	7500	36x5	36x4	
Cone	Plan.	2 Chain	2 Wheel	130	62	Arm'd Wood	Bronze		Timken	8500	36x5	36x5	
Cone	Selec.	3 Chain	4 Screw & Nut	127	62	Channel	Bronze		Timken	5600	36x4½	36x5	
Cone	Selec.	3 Chain	4 Screw & Nut	124	58	Channel	Bronze		Timken	7500	36x6	36x4	
Cone	Selec.	3 Chain	4 Screw & Nut	Opt.	72	Channel	Bronze		Timken	6800	36x4½	36x3	
Cone	Selec.	3 Chain	4 Screw & Nut	150	68	Channel	Bronze		Timken	5500	36x4½	36x3	
Cone	Selec.	3 Chain	4 Screw & Nut	122	58	Channel	Bronze		Timken	5500	36x4½	36x3	

EN \$4,000 AND \$5,000

Cone	Selec.	3 Chain	4 Screw & Nut	126	72	Channel	Bronze	H. B.	Timken	8800	36x6	36x4
Cone	Selec.	3 Chain	4 Screw & Nut	154	68	Channel	Bronze	H. B.	Timken	7000	36x5	36x3½
Cone	Selec.	3 Chain	4 Screw & Nut	126	68	Channel	Bronze	H. B.	Timken	6800	36x5	36x3½
Cone	Selec.	3 Chain	4 Screw & Nut	132	72	Channel	Bronze	H. B.	Timken	10M	36x6	36x4
Cone	Selec.	3 Chain	4 Screw & Nut	132	68	Channel	Bronze	H. B.	Timken	8500	36x6	36x4
M. D. Plan.	2 Chain	2 Gear & Sec.	90	56	Pres'd Steel					Timken	3½	4
M. D. Plan.	2 Chain	2 Gear & Sec.	100	56	Pres'd Steel					Timken	3½	4
M. D. Plan.	2 Chain	2 Gear & Sec.	111	56	Pres'd Steel					Timken	3½	4
M. D. Plan.	2 Chain	2 Gear & Sec.	100	56	Pres'd Steel					Timken	3½	4
M. D. Plan.	2 Chain	2 Gear & Sec.	111	56	Pres'd Steel					Timken	3½	4
M. D. Plan.	2 Chain	2 Gear & Sec.	111	56	Pres'd Steel					Timken	3½	4
M. D. Plan.	2 Chain	2 Gear & Sec.	108	64	Wood	Plain	Plain	Timken	7000	36x6	36x4	
M. D. Plan.	2 Chain	2 Gear & Sec.	100	64	Wood	Plain	Plain	Timken	32x2½	34x2½		
M. D. Plan.	2 Chain	2 Gear & Sec.	108	64	Wood	Plain	Plain	Timken	34x3½	34x3½		
M. D. Plan.	2 Chain	2 Gear & Sec.	108	64	Wood	Plain	Plain	Timken	34x4	34x4		

Of course, there are and always will be structures suited to a limited class which wishes the smooth running of the eight-cylinder motor and to this class the superb six-cylinders, of which there are a goodly number, will appeal; but eight-cylinder vehicles will not be in evidence notably and the lighter fours will attract the attention of the majority, with a lesser number of two-cylinder cars like the Jackson, Lambert and Maxwell which are made in large numbers but do not appear so largely in evidence at a show.

More closely connected with the internal construction are such things as magnetos. Advocated by a few leading spirits for years, the magneto has at last largely come into its own and its adoption on vehicles of less than \$1,000 in price, marks a distinctive step forward in certain and satisfactory sparking. On the Ford touring cars the magneto is built into the flywheel and adds the major part of its weight to the wheel while producing ample current for the ignition of the explosive charges in the cylinders.

Emergency Gasoline Tanks

Lucky is the man who has not at some time been stopped on the road by an empty gasoline tank. This works to the discredit of the maker almost as much as mechanical failure and therefore many now fit the reserve tank which has one compartment that will not run empty till the main tank has been emptied and the operator forced to open the reserve supply cock, after which he can proceed some miles further and have time to secure a new supply. Even on the lower-priced rigs such as the Duryea buggyaut this arrangement is found.

Oiling System Simplified

The oiling systems have been simplified and placed on or near the parts they serve instead of on the dash. Speedometers and odometers and often clocks have been combined into one instrument which is a serviceable ornament instead of a complicated clutter. Slowly, users and makers are awakening to the fact that the useless is not beautiful in a thing of daily service as a motor car, and simplicity is taking the place of complexity in many places. For the first time will be introduced vehicles which do not even have oilers but feed the oil with the gasoline. This should be appreciated.

The two-stroke cycle motor as used by the Atlas, will



Tendencies of Construction

TO LET it be supposed that a great exhibition like the one now to take place in the Grand Central palace can be held year after year and no good come of it would be false. China tried to live in isolation and that ancient empire fell away to nothingness because the time came when she had nothing more to teach her progeny, nothing more to learn from herself, and nothing to gain by living. The motor car industry, aside from any attempt to stimulate trade, has much to learn and of progress the half of it is yet as the unearned increment. Each year with its offering renders up an accounting on a scale far greater than the previous and the question is as yet unanswered as to when the end of the years of great improvement will say a last farewell.

The doings during 1908 in preparation for the 1909 trade were the most active, and, on the whole, the most advanced in the way of practical results. The plausible theories were given a working chance, the afterthoughts were put in better settings, and the things that promised much and delivered little were withdrawn from active service. The effect of quantity on cost is to be seen at every hand, but all the improvements to be noted must not be understood as the product of doing things on a large scale. As a matter of fact many of the crystallized features in the 1909 motor cars were long in contemplation awaiting the day when they could be utilized to advantage, and in many instances they took the place of less desirable schemes, thus rendering the improvement of double value.

Variety is the password, and a cleaner line of demarcation is to be distinguished. The condition of chaos that once permeated the situation is gone. As it is, the respective classes or types of cars are distinctive, and are capable of being classified.

Various Runabout Types

In the main this class of cars is of the single-seat variety, but it cannot be said of them that they are confined to the cars in which the motor is of the one-cylinder design, since some have two cylinders, and the four-cylinder runabout is also to be seen. In some cases the little cars have accommodations for more than two persons in that either a rumble seat is furnished, or a folding seat is provided. In general they have longer wheelbase dimensions than formerly, and they are very much more formidable than even some of the roadster types of even last year.

They cover a wide range both as respects the size of the cars and the power available. In some cases it is difficult to tell a roadster from a runabout, and, again, the roadster looks like a big racing machine. The roadsters use motors from the low-powered double opposed to the finest examples of the six, with fours numerous.

Light Touring Class in All Sizes

There is probably no other division of the industry that has undergone nearly the same evolution as the light touring cars. They are in great presence, in divers sizes, and they represent value such as it was never before to be seen. The cars in

By Thomas J. Fay

the light touring class would put to shame the foreign red devils that cost \$10,000 less than 4 years ago. The wheelbase ranges from 100 to 110 inches, and the motors are of the four-cylinder type, for the most part rated at from 24 to 30 horsepower. As a rule the bodies are of the five-passenger touring class—straight line effect—with ample accommodations and artistic in effect. On the whole, it is these cars that will be the mainstay of the makers in this field for the immediate future.

The Standard Touring Cars

Standard touring cars are cars in the broadest sense of the word. When the dictionary is restandardized and the word motor car is defined the definer will have the image of these cars in mind, and he will be right. Any further play on words is a loss of time, and yet to dismiss the most interesting part of the exhibition without affording to the cars as much space as is accorded the runabout types would seem to be ill-advised. In these cars the power plant is the most complete and systematic piece of sturdy mechanism that man ever devised. The wheelbase is long, ranging from 110 inches as the low range to 140 inches in the extreme examples. The body work, aside from the luxuriousness and the space afforded is art personified. The silent performance is the wonder of the age, and it is due to absolute precision of fit of the 2,400 separate parts that enter into the construction of a motor car of this class. One single loose member in a car of so much power and speed would make itself known were it of an ill fit, or if the relations were out of harmony. The motors range from the big six down to the four-cylinder examples of equal or even greater power.

Town Cars for Public Hire

In the town car class will be found rigs not with great power or of a long wheelbase, for neither are necessary. The wheelbase is not far from 100 inches as an average figure, and the power is rarely over 30 horsepower with a short wheelbase. The road performance is quite in accord with the needs, and as the speed is not to be high, considering paved streets, the power does not have to be over the maximum stated, while some of the examples are with even half—or less—of the figure given. The body work in town cars is the exterior feature that attracts attention, although from the mechanical point of view it is the least of the features to be considered. At all events the body work in the town cars is the most luxurious and the most costly of all the work there is to be seen. The bodies are made in broughams, landaus and limousines richly upholstered and fitted with every convenience possible to place on wheels, from the point of view of convenience and comfort.

The surprise of the exhibition is due in no small measure to the number of cars of the buggy type to be seen, and again to the fact that while the buggy type has held to its aims it has expanded and amplified. The uses to which these cars can be put, in view of their low first cost, coupled with their extreme simplicity and low cost of maintenance, are not to be lightly regarded. They serve for a wide range of purposes largely in the utility zones of activity, and they number their

friends by the thousands among the pleasure seekers as well. The power for speed is high, which is but a way for calling attention to the fact that they will make headway on all kinds of roads in inclement weather. The body work holds to the buggy type as it was handed down by the craft and the reasons are good.

The Field of Taxicabs

Taxicabs differ but little from town cars, unless it is that the body work is with a view of hard usage. The power plant is generally identical, with a short wheelbase for the same reason, and as to speed there is no occasion for gearing to a high ratio, hence the power is limited as well. There is goodly showing of cars for this service, and the schemes of design are such as to assure a low cost of maintenance.

For public service there are fine examples of cars to be used in fire, hospital and police service. Most of the companies which cater to this class of trade find it of small avail to exhibit the products and are therefore content to depend upon literature to make known the facts. But if there are cars for municipal work, it is true as well that sight-seeing rigs and cars for hotel bus service are in a high state of development. Indeed, this phase of the industry has grown wonderfully, and the demand is strikingly large.

Having thus introduced the several types of cars to be seen at the show, it may not be out of place to discuss the mechanical trend in some detail, hoping thereby to evolve the drift of events. But if it is expected that this exposé will be as an indication of revolutionary thoughts, disappointment will await the reader. A thorough examination of all the products at the show fails to develop anything but a more complete refinement of accepted principles as they have existed for several years.

Power Plant and Its Tendencies

Motors are divided up among the three classes as follows: four-cycle, water-cooled; four-cycle, air-cooled; two-cycle, water-cooled in the proportion as they have heretofore held, with little indication of gain, the one over the other. If anything can be said, it will be to maintain that each type has its supporters, and they find no valid reason for backing down.

In spite of all the talk that has gone the rounds the fact still remains that the situation is substantially as formerly, in that the single-cylinder propositions are looked upon as a stable basis, serving well in the cases requiring about 10 horsepower. There is even a tendency to take advantage of the inherent economy of the single-cylinder idea. It is well known that a single-cylinder motor indicates a high thermal efficiency which is but another way for saying that the gasoline consumption is low in the type. With a well-balanced reciprocate member, and fairly long stroke, if the flywheel is suitably designed, the single-cylinder motor serves as a suitable source of power in the cars weighing not over 1,000 pounds.

The double opposed idea is still to be seen in the cars in which its application has been found to be advantageous and there are fine examples of the scheme scattered all through the show. There are no three-cylinder motors to be seen, the reason for which has never been adequately explained. Of the fours it might be said, the woods are full of them, and of the sixes, they are there, in far greater and more imposing presence than ever before.

How the Cylinders Are Made

Individual cylinders are about as prevalent as before. Cast in pairs has held all former ground. *En bloc*, representing the real advance, has numerous good examples. Gray iron is used, a little better than in former years, walls more uniform, and the desire to attain tissue-paper thickness has retired to obscurity. Waterjackets extend down to about the lower end of the stroke, thus affording a cooling medium on the exterior surface of every portion of metal that entertains hot gases on the interior surfaces. Steam pockets are carefully avoided, and unequal expansion is a phenomenon of the past, in so far as skill can influence the situation.

The five-bearing type of crankshaft for four-cylinders is

fighting the two-bearing type for supremacy. The three-bearing crankshaft is as a disinterested spectator on neutral ground. In the show, it is fair to say, the three-bearing crankshaft is in the greatest presence, with the five as a close second. As to the bearing, it is to note that the plain type is still the mainstay, with here and there a fine example of what can be done with ball bearing crankshafts. The ball-bearing type seems to hold well in every case in which it is so fortunate as to gain a footing, but it does not spread rapidly because of the higher cost. If plain bearings will do the work, they being cheaper, the makers naturally hold to them. The materials of the crankshafts are not jewelry steel as some of the alloyed products are called, unless in a few cases. The plain seems to be one in which advantage is taken of the fact that heat-treated steel holds the requisite qualities to a marked degree, and since a slight increase in section lends enormous extra ability, the section is a little flatter and the material is far easier to work, while the cost of replacement is relatively very low indeed.

Aluminum and Cast Iron Contend

In crankcases and the housings for gearsets, aluminum is the main product. Cast iron is used in isolated cases. That cast iron is the superior metal from the strength point of view is not to be gainsaid. That aluminum is lighter, goes without saying. In all the examples there are evidences of refinement in point of design, and here and there are examples in which provision is made to get at the bearings through covers big enough to serve the purpose. The bearing supports are more stable than formerly and the means for disposing of the used oil are carefully worked out.

The valves of special steel, in probably every instance, are not extra large, nor are they small. They are, in point of area, as large as possible, without becoming noisy. This question of noise has been looked after to a mighty degree. Makers have looked at the question from the angle that the patrons take, and the result is a happy medium between large valves and noiseless performance. The tappets and guides are with adjustments in most cases and the play is so little as to abort the tapping noise that made motors conspicuous up until a short while ago. By suitably shaping the cams, it was found possible to do away with almost all of the lost motion, instead of the large amount that formerly did obtain—as much as $\frac{1}{8}$ inch in some cases—and means are provided to cushion the tap in notable instances. The half-time gears are more healthy than in earlier examples, in that they are more securely keyed on to the shafts and spindles, while the gears themselves are of wider face, and better material than before.

Clutches in Varied Fashions

The multiple-disk clutches are slowly taking definite shape along lines in which an attempt is being made to depart from the trouble tendencies of the type. It is well understood that a large number of thin disks will ultimately give trouble because the edges of the disks as they press against the keys will broom and then the members will not engage. It is also known that oil will become gummed and then the clutches will fail to do the required work. Then, there is the question of flashing the oil, if the pressure is high and the clutches slip. The tendency is in the direction of fewer wider disks, lower pressure, and materials that will show a high coefficient of friction at low pressures in oil with a high flash point and free from tendencies to gum. The disks are naturally of an increased diameter, and in many cases cork inserts are used; they afford the requisite advantages.

Besides multiple-disk clutches, there are many of the well known cone clutches in use, some with leather faces, but more with leather together with cork inserts, it being the case that the presence of oil on the faces will work no ill effect if the cork is used also. Besides the clutches as before stated, there are examples of disks with grooves in the faces, and some examples of band clutches as well. On the whole, the clutch

situation is in a very encouraging state, and failures will not be found in the cars at the show.

Three speeds and reverse, direct on the high, selective and the gear story is three-quarters told. A few of the gear-sets are with four speeds, direct on high or seconds; the planetary type is used in the well known cases in which the advantages are not to be gainsaid. Of the progressive types of gears there are few examples, those of the makers that have always adhered to the principle claiming for them that ease in shifting that comes with no chance of sliding into the wrong speed, or stalling the motor. The materials used in the gears are mostly alloy steel of the finest grades, and trouble in gears due to inferior material is now unheard of.

Live Rear Axle Constructions

With floating, semi-floating and keyed shafts, all are to be seen, under such splendid conditions of designs, material, and workmanship as to render a choice as the expression of a prejudice rather than as a necessity. The housings are far more stable than formerly, notwithstanding the fact that excess weight has been eliminated very largely, if not completely. Struts are still used, but they are more stable, and in some cases the housings are as drawn steel tubes free from joints and they are quite as good as they look. The spring perches are not brazed, but are allowed to slip on the tube, within limits, doing away with the strains that formerly did reside in the springs on that account. The differential and the bevel drive, all housed in, with adequate means for oiling, frame up for continuous and noiseless performance as never before, while the ground clearance is now adequate.

Side-Chain Drive for 1909

From abroad came a story that the sprocket, as a passing fancy, is losing ground. They may be copying some of our shaft-drives over there; they can well afford to do it; we always had them on the hip in this connection. But let us not go wild about their slants. In stable America there is a place for everything, and we know the value of putting the right horse in the right stall. That the chain situation is now just as good as it ever was, is shown by statistics which did not prevent the multiplication of the shaft drives. The distribution has followed along natural channels, and that the same is now fairly representative of what will be a natural future is assured by those who seem to be abreast of the times.

Brakes as Makers Fit Them

The new crop of brakes is in anticipation of the fact that the community will demand good ones in the future. Time was when cars were studded with brakes, none of which was over good, and numbers were placed to make up for the deficiency in point of quality. In the 1909 cars the brakes are capable in the extreme, and, as a result, few in number. In some cases there are two sets in the rear wheel drums—internal and expanding—while in other examples the old idea holds sway, in that one set is on the rear wheels, and a differential brake is used for service. In all the examples the drums are of increased diameter, and the faces are ample to assure long life. The facings are all the way from metal-to-metal to cork inserts with a decided tendency to get away from the class of materials that will not stand heat. Fortunately the properties of cork are such that they will not char and the presence of oil does good. The further tendency is in the direction of the use of asbestos.

Departing from the question of the types of live rear axles it is to note the very general use of I-section axles, both for rear and front. They are die forged frequently without welds, and so nicely proportioned for the work as to be difficult to improve upon. In heavy trucks the axles are both I-section and square, depending on circumstances. The road wheels turn on ball and roller bearings, and in general the construction is all that can be desired or suggested.

Wheels, Rims and Tires

As a rule the wheels are of wood, with nicely shaped spokes, and insofar as can be determined at the show the wood is up

to a high standard. There is evidence of the use of disk wheels, which in the course of time will have to be seriously considered, unless a new supply of wood can be located, wood such as will maintain the high standard claimed for second growth hickory, which is growing more scarce year by year. Rims are up to a high standard with a decided showing of demountable methods. Tires are larger than ever before, which is one of the year's improvements. The foreign idea of using dual rear pneumatic tires—as is the practice with solid tires on commercial trucks—has not been adopted in this country. Spare wheels are in good demand, and the motoring public seems to take to the idea.

Channel sections of alloy or special carbon steel seem to be the mainstay. Wood is used to some extent. The motoring public now fully understands that wood is adequate for the purpose, and it also knows that the channel section is appropriate. Referring to the channel section, the shapes are much more stable than before and the drop frame idea is much in vogue, especially in town cars but not confined to them. As a rule the frame is deeper and the flange is wider, while the laterals are nicely placed and well braced.

Three-Point Suspension

In point of theory, the three-point suspension principle is adapted by every builder of cars, but it is not directly applied in all cases. When the unit power plant is used the three-point suspension is invariably directly advanced. When, however, the separate unit system is used, then the three-point suspension is applied to the separate units. In some cases the principle is so deftly applied that only the designers are fully alive to the fact. In other words, they may fasten at four points, but closer observation will show that one of the fastenings is with a clearance hole, so that the fourth point is merely a rest, the advantages of which are self-evident. On the whole it is fair to observe that the principle of the three-point suspension is in pretty general use.

A goodly number of the cars of the year embody the self-contained power plant idea. In other words, the motor, clutch and transmission gearset are all enclosed within one housing, and the claim is made for them that the bearings will maintain correct alignment. Nothing could be nearer the truth, and the plants so designed are very compact, indeed.

As against the self-contained power plant, there is the old standard construction in which every unit is separate. In this construction all the bearings are maintained in alignment, because there is no rigid connection between the separate units, and within the respective housings the alignment is under the best possible conditions, because the housings are short. Universal joints are used between the units, and they, in turn, are housed in, thus preventing the oil from escaping and grit from entering. In this class of work, it is the aim to be able to remove one of the units without disturbing the other, and this plan is nicely carried out in the examples to be seen. It is fortunate for the purchasers of cars that they can embrace the talking points of either school, with no very great fear of having to suffer for their choice. Both plans work and that is all the purchaser, in any case, is entitled to, unless it is that he would like to bolster his business acumen to the extent of enjoying the feeling that would be his were the plan he rejects to prove a failure. To this extent the 1909 purchaser is booked for a disappointment.

Various Types of Spring Suspensions

The springs as they now obtain car the vibrations as they never did before. The reason for this is not on the surface, nor it is well understood by motorists in general. It was not so long ago that it was the style to lay the failures up to the quality of the material used in the springs that failed to render complete returns, when as a matter of fact it was because enough material was not used. When, in the attempt to improve, a scant amount of inferior material was supplanted by a more scant quantity of the finest material, it came as a surprise when the trouble increased instead of decreased. It did not take long to determine that it was largely a matter of

supplying the requisite quantity of material to accomplish the task. A pound of steel will dissipate a certain amount of energy on a basis that will not shorten the life of the steel below a commercial point. If the steel is of a fine grade, it will have a longer life, but it is also true that however good the steel, if it is sadly overworked its life will be short indeed. In the cars of the year this matter is on a fair footing, and as a result the springs, while they look very much as in the past, they are more capable. There is a growing tendency in favor of scroll types of springs, in relation to which there is an argument that speaks well of them. Otherwise the situation is as formerly, excepting that it is the custom now to use enough material to perform the service.

Ignition Systems in Use

Magneton are now regarded as a finality, and they are used extensively, if we may not say to the exclusion of the other systems. In every case in which a dual system is employed the magneto is there as the system to run on, the coil being placed for emergency purposes. Were magnetos lower priced, they would be employed to the exclusion of coils on the systems using but one source of energy, provided motors could be started on the magneto, which does not seem to be impossible. On the other hand, the coil systems have improved so much that they are thoroughly capable under all the conditions in which it is not necessary to squeeze the last drop of power out of the motor. Many of the smaller cars are fitted with coils, and in some cases master vibrator systems are used. In some instances the magneto is used in conjunction with a battery, both as the source of energy and a step-up transformer is employed in common between them. In any event, with ample motors and light cars rolling on wheels of big diameter, it would seem as if the ignition question is quite well settled.

Types of Fuel Systems

Gasoline is still the liquid fuel, in spite of all the talk that went the rounds bearing upon the question of the availability of alcohol. Carburetors are water-jacketed to a considerable extent, the idea being to run the hot water from the exhaust into the jacket of the carburetor to absorb the latent heat in the fuel that manifests itself during the period of evaporation, retarding the rate of evaporation. In some cases, as formerly, hot air is used. In only one or two instances is the formality dispensed with. Automatic carburetors have not made the headway that was promised for them and the auxiliary air supply is still with us. There is some evidence of what may be called "carburetor complication," but it is quite limited, and of justification there may be ample; one cannot tell at the show. Gasoline tanks are of liberal size, which, however, is not a compliment. The tanks are very well made, and the piping is quite healthy in most cases, with here and there a car in which so much is given at the price that the piping shows evidence of skimping.

Lighting Motor Cars

Gas tanks are as thick as fleas on a dog's back, and they vie with the generators for supremacy. Let it not be supposed, however, that they are having it their own way. Generators are to be seen in great numbers, and they are not all on the low-priced cars. In other words, it is an even break, with little chance of either system falling far below the high estate they now lay claim to. Piping for the gas is not so good as it might be.

Of the lamps, too much cannot be said for them. They are in fine taste, there is a wide range to choose from, and for lighting—which is what they are there for—it is believed they are more capable than they ever were before. On the low-priced cars, die-forged steel brackets are used; they are capable, but it cannot be said of the cast bronze kind that they are quite as good as die-forged steel, which can be rendered as brass if they are roll-plated, as they are in the fine examples to be seen. The oil lamps that look like hearse lights—as some wag put it—do cut a shine, and in the night time they keep it up. The question of electric lighting is one that

we have not heard the last of. This method of lighting is forging to the fore, and it has a legitimate zone. Batteries are now so good that to use them for lighting, as well as the ignition system, is the natural thing to do. It is being done.

Tops and Windshields

In the touring car class cape tops are much in vogue, and they have reached a high state of development. They, with windshields and curtains, go a long way towards rendering touring under inclement conditions of weather less to be dreaded than ever before. The windshields have more of the "dodger" principle than formerly, and they do not rattle. The tops are not only in good style, but they are well made; broken bows should be of the past.

If it is desirable to protect the motorist from the ills of inclement weather, it is equally desirable to keep mud accumulations from the motor and the rest of the power plant. This is looked after in a fitting manner, and the mud aprons are not only capable but they are easy to drop down, in order to be able to get at the machinery in the event necessity dictates. In this connection, it may not be out of place to call attention to the year's offerings by way of adequate mudguards, which is a matter that was never before on a fitting basis. As it is, the mudguards extend down to the chassis and the amount of protection they thus afford is only equalled by their neat appearance. The fellow that invented the flaring mudguard was helped enormously by the other fellow that added the mud drip, but the idea of extending the mudguards down to the frame was the one that capped the climax.

Both noise and lubrication will be treated in common, on the ground that in the absence of one, the other will render itself manifest. The absence of oil will at first show by a squeak. In the long run the squeak will propagate a rattle. Lubrication, then, is important, and it is pointed out that no amount of oil in the crankcase, for illustration, will be of avail when it comes to preventing rattle in the multitudinous small parts and in and about the chassis. If oil cannot be used, a grease cup can. If the parts are coated with oil or grease grit will be warded off, and noise will not creep in. If a squeak is an indication of a dry surface, rattle tells of the fact that the squeak fell on dull ears. At all events, it cannot now be said of the builders of cars that they failed to do their part, for in about every case the oiling question has been treated seriously. The systems are not all the same; all the designers did not reach exactly the same conclusion; but they all seemed to be alive to the facts, and all made a stagger at a solution of the problem, to say the least. It was a good stagger, too; the end was a complete solution of the problem in the great majority of cases. It is nice to see universal joints protected from dirt, and oiled. This year's cars are good in this respect. Grease cups are used to a large extent. Grease may now be had in which the lubricating qualities are equal to the same qualities in any fine lubrication oil. A clean dash is in style; this comes through the use of force feed oilers, aided by the fact that magnetos are used for the ignition systems.

All the Cooling Systems

Radiators are in several styles, as honeycomb, vertical tube, horizontal tube and flat plate, or plates of thin copper fashioned in imitation of the honeycomb type. Then there is the round tube radiator, as used on some of the fine examples of cars. At all events, it is to note a fine display of radiators. Of pumps for the circulation of water there is the centrifugal and the gear pump, not forgetting some flat "paddle" types to boot. In notable instances the thermo-syphon principle is used, and on the whole the cooling question is handled so that few indeed are the cars that are troubled with steaming radiation or hot motors. Of the piping it is assured that a better condition prevails. Within the water jackets of the cylinders much has been done to eliminate trouble, and it is a noteworthy fact that cooling is less in need, which is another way of saying that the amount of heat to be wiped out of the water is reduced and the radiators have less work to do, hence the tendency to steam is reduced.



THREE or four constructive features of the 1909 car stand out so prominently that the trend of design cannot be mistaken. Occasionally the ranks are so equally divided on two constructions that it is impossible to say which will be the ultimate winner, but for 1909 many of these contests between one construction and another are so one-sided that there is not the shadow of a doubt as to the eventual outcome. The advent of new designs must not be overlooked, and although not more than half a dozen manufacturers out of seventy show this or that design for 1909 it is not a sufficient criterion that it will not become popular. The thin edge of the wedge must be entered at some time and the early pioneering work must be done, so that if there are only half a dozen in the ranks at the present time these may multiply fourfold within the next 12 months. The American maker does not go in landslide-form to a new construction; rather, the scheme is one or two makers one season, half a dozen more the next and a score or more the third.

A resume of the motor types shows that the two-cylinder style is far from being extinct, no fewer than seventeen makers building this type, including such familiar names as Maxwell, Reo, Jackson, Lambert, Rambler, Cartercar, Atlas, Oakland and an additional list of motor buggies and commercial cars containing such names as Reliance, Rapid, Grabowsky, Holsman, Reliable-Dayton, Schacht, Black, Kiblinger and Hart-Kraft. The majority of these place the motor in front, but the Reo, Rambler and the majority of the motor buggies continue the amidship location. Reo and Brush are the only examples of the single-cylinder motor. To these might be added the Omar toy car. The two-cycle exponents are Atlas, Reliance and Simplex, the Reliance being a commercial product. The three-cylinder car is represented only in the two-cycle ranks by the Atlas and Reliance makes.

The six-cylinder is constantly gaining ground, eleven makers showing it. Of these the Pullman, Austin, Mora, Premier, National, Acme, Chadwick and Welch exhibited it a year ago. The additions to the ranks are Cameron, Overland and Kisselkar. The four-cylinder still continues supreme. Leaving the battle of the cylinders to be settled under the impartial umpirage of Father Time, the question of ascendancy in certain motor constructions calls for attention. Low-tension ignition has exponents in the Premier and Gaeth cars, all of the rest using the jump spark with magneto or battery supply. Valve-in-the-head motors are increasing, although the placing of the camshaft above the



LAMBERT SMALL RUNABOUT CAR

cylinder heads is used by only such concerns as Stoddard-Dayton, de Luxe, Moon, Welch and Jackson. There is little change in the situation as to whether the T head or the L head cylinder is the better. All are agreed that attention is needed in the lubrication question, and it is most important to know the number that has started placing the oiling system with the crankcase, and those who continue the mechanical oiler, carrying it in the bonnet instead of on the dash.

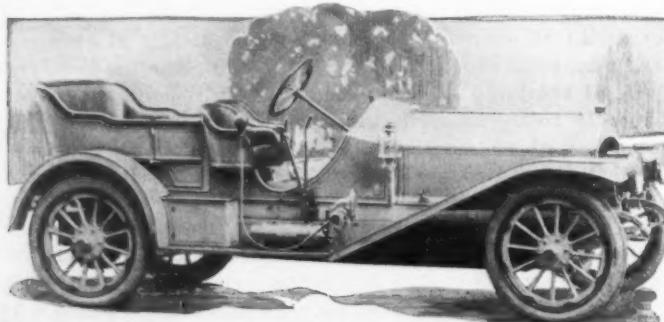
In cooling the gradually increasing tendency of using thermosyphon circulation cannot be overlooked, in spite of the fact that few new additions have been made during the year, including such names as Moline, Regal and Grabowsky. The old stand-bys, such as Gaeth, Jackson, Overland, Maxwell and Cartercar, continue it.

The problem of air-cooling is where it was a year ago. The majority of the air-cooled cars, eight makes of which will be exhibited, being low-powered machines and many of them of the motor buggy type. The Gramm-Logan and Hart-Kraft are examples of air-cooling in the commercial field and Cameron, Holsman, Black, Kiblinger, Anderson and Middleby are representatives of the pleasure field.

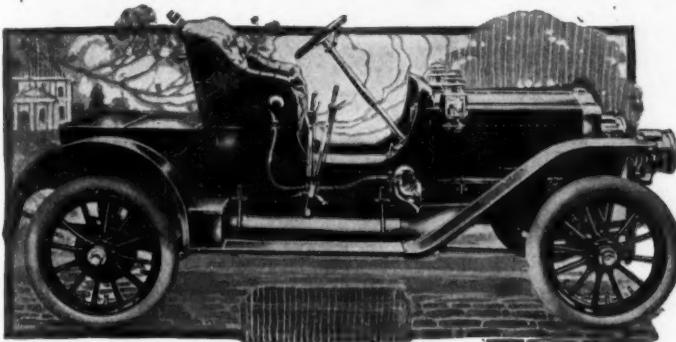
It is impossible to mistake the tendency toward selective gearsets in regular cars; the exponents of the progressive type decreasing in number each year. One of the big makers to cast its lot with the selective ranks is the Mitchell; another is the four-cylinder Mora. A few of the progressive adherents are Gaeth, Acme, Maxwell, Oakland, Black, Sultan, Gramm-Logan, American and Atlas. The Welch car continues as the representative of the individual touch type of gearset in the pleasure car line and the Manhattan occupies a similar position in the commercial department. The exponents of the planetary set have not increased during the year, nor have those of the friction types. Nineteen hundred and nine is unmistakably a shaft-drive year; the side chain manufacturers being confined to Acme and Chadwick.

In bodies the toy tonneau is the craze, the four or three-passenger roadster type being continued as are the two-passenger rigs.

Acme—Pinning its faith entirely to the six-cylinder motor, the Acme Motor Car Co. will show two chassis models, each equipped with six-cylinder motors. Both of these models are chain-driven with brakes on both rear wheels and jackshaft. One noticeable feature of this motor is the intake manifold, which is of T design, having a large chamber where the vertical tube connects with the



THE ACME SIX TOY TONNEAU



ONE OF 1909 MAXWELL RUNABOUT STYLES

horizontal. The motor is equipped with a double ignition system. A high-tension magneto placed on a bracket integral with the forward end of the crankcase supplies the current to one set of spark plugs, while the other set of plugs is connected to a distributor coil and storage battery. Parsons white metal is used for all motor bushings, and Hess-Bright and Timken roller bearings for gearset and wheels respectively. One trend in construction is toward lightness without sacrificing strength.

Lambert—From its inception the Buckeye Mfg. Co. has been a strong exponent of the friction drive system. This year the company will show four models, one powered by a double opposed motor and the other three by four-cylinder Rutenber motors of 4 by 4 and 4½ by 5 stroke and bore respectively. One great change from last year's models is in the friction system. Hitherto friction has been obtained by having the jack-shaft carrying the friction pulley on a swinging bracket, but this year the jackshaft is in a rigid bearing bracket and the friction disk on a continuation of the motorshaft is slid to or from the pulley. This continuation shaft is supported in a Hyatt roller bearing attached to a cross member of the frame and equipped with abundant thrust bearings. Another improvement is the use of a Morse silent chain for transmitting the power from the jackshaft to the rear wheels. This chain is covered by a dust and oil tight chaincase. The new model 30 is the leader in the car line, as it employs the Morse silent chain final drive from the jackshaft to the live rear axle. The low-priced runabout car is continued.

Maxwell—The Maxwell cars for 1909 are in two and four-cylinder types, there being six models in all. The first is the Maxwell Junior two-cylinder car with 4 by 4-inch cylinders which has been improved by the addition of strut rods from the frame to the back axle. Next comes the 14-horsepower two-cylinder car with 4½ by 4-inch cylinders but fitted with magneto and battery ignition. Like the Maxwell Junior it has a planetary gearset. The third member is the 20-horsepower two-cylinder chassis, with 5 by 5-inch cylinders and double ignition. This chassis has a sliding gear transmission. Following this, is the doctor model of the same chassis line. This completes the two-cylinder classification. In addition to it is the four-cylinder type having separately cast cylinders with opposite valves and a unit power plant. All of the Maxwell motors are characterized

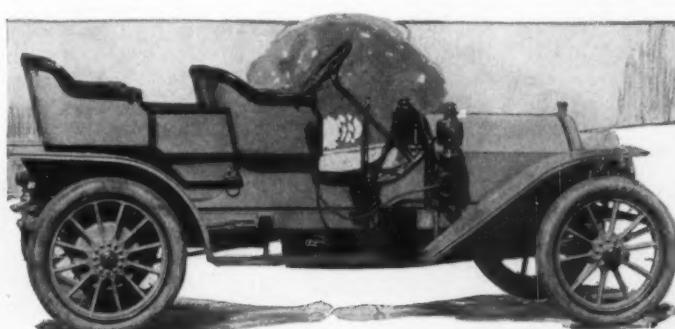
with flywheels at the forward end and timing gears at the rear of the four-cylinder type. The multiple-disk clutch is incorporated in the gear box.

Premier—Characteristic ear marks of the Premier chassis consists of four cylinder motor with 4½-inch bore and having a gun iron crankcase which is stronger than and slightly heavier than aluminum. The major ignition system is a make-and-break one with current from a Bosch magneto. A supplementary system includes battery, coil and distributor. The rear axle is of special design, the housing consisting of two bell-shape crucible steel castings heavily ribbed on the inside, bolted end to end, with the differential carried in the space formed by the opposing bells. The drive shaft of the axle as well as the differential are carried on ball bearings, there being but one bearing carrying each rear wheel on the axle tube. A patented feature about the axle is a supporting shell which forms a bearing for the rear end of the pinion shaft. The brakes are particularly large and are internal and external ones operating on 15 by 3-inch drums.

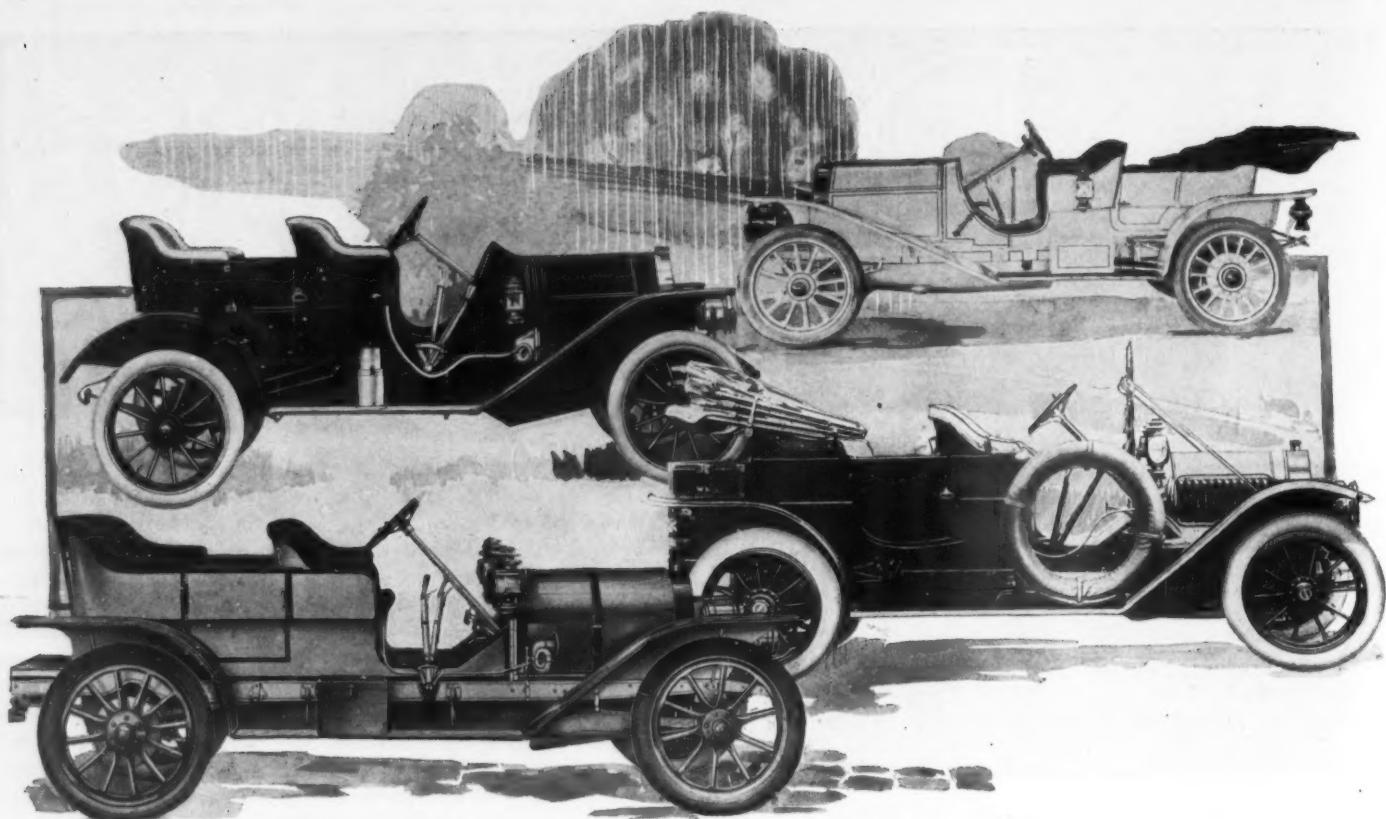
Gearless—Maker of the Gearless Grayhound and a line of cars that has attracted favorable notice in recent years, the Gearless Motor Co., New York, will enter the show with five models. The Gearless comprises three models with four-cylinder motors. Two of the models will be sixes. The power ranges from 35 in the lowest to 60 horsepower in the car of the highest price.

De Luxe—In the class of "nothing too good for those that want the best" belongs the de Luxe, a product of the de Luxe Motor Car Co. This car is shown with one chassis model, powered by a valve-in-the-head motor, with one cam for each set of valves. The crankshaft is furnished with the D. W. F. annular ball bearings at its three main bearings. One of the features of this model is the number of ball bearings used in its construction, thirty-three sets in all. The use of chrome nickel steel enters largely into the construction of this car. The de Luxe patented rear axle of the double type is still a feature of this car. A selective gearset with metal-to-metal cone clutch transmits the power from the motor to rear axle.

Oakland—After a year of successful operation with one model, the Oakland Motor Car Co. has an entirely new chassis in addition to the older model. This new member of the family is styled the Oakland 40. It is driven by a four-cylinder 4½ by 5 motor of 40 horsepower rating. The valves are all on one side and it has the following exclusive features: The cylinder head proper is



PREMIER TOY TONNEAU FOR NEXT YEAR



OVERLAND AND STODDARD-DAYTON TOY TONNEAU

NATIONAL FOUR-CYLINDER AND DE LUXE TOY TONNEAU

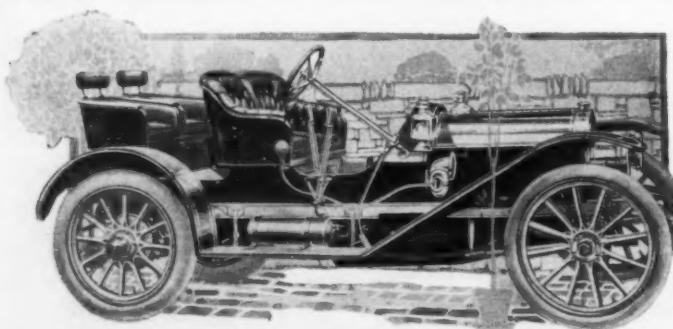
not cast integral but is covered by a large plate, which is threaded into the end of each cylinder to facilitate the removal of pistons and affords an easy method of removing carbon from the cylinder and piston heads. The motor is placed in the frame on an enclosed plane, which is almost the same as the driving shaft. The gearset is located on and is integral with the rear axle by means of a long housing and is placed near the center of the car. It is of the selective sliding gear type, with a multiple disk clutch, self-contained. This model is to be shown with different types of body construction. The other model is the Oakland 20, with a two-cylinder vertical motor, in which the counter weights are carried on a gear-driven countershaft. This model uses a planetary transmission, which is carried on the rear axle housing near the center of the frame.

Stoddard-Dayton—Looking as nearly alike as peas in a pod are the three different chassis models of the Stoddard-Dayton line. In fact, so closely do the different models resemble each other and so well proportioned is the design that at a distance it would be difficult to name any one of them. The general lines of last year's model 8F are strictly adhered to in each of these models. The design of radiator with its oval filling cap, valves-in-the-head motor, with one cam for each pair of valves, selective gearset, etc., are identical. The principal changes noticed are the casting of the cylinders with waterjacket integral and large end plates bolted on. This eliminates the chance of leakage afforded by the

copper waterjackets. The gearset control lever is now placed outside the frame instead of through the floor boards as formerly. The frame is greatly strengthened by making the section wider, deeper and of heavier grade stock. Larger brake drums made of steel stampings are used instead of malleable iron castings. The side strut rods are attached to the frame in a new type of basket, having a bolt and eye connection instead of the ball and socket as formerly used. The change of material tends to the use of heat-treated chrome nickel steel wherever necessary for strength. The steering connections have been raised and placed above instead of below the front axle. To indicate the faith in the valve-in-the-head motor, the two new members of the Stoddard-Dayton family—the 9A and 9H, of 25 and 35 horsepower respectively—are both powered by the same type of motor, the only difference being in dimension. These chassis models are furnished with different types of bodies at the option of the purchaser.

Overland—The Overland line, manufactured by the Overland Automobile Co., has had an increase in its family of two models, namely, No. 32, a four-cylinder 30-horsepower, and No. 34, a six-cylinder 45-horsepower. The cylinders of both of these models are identical in size, having a 4-inch bore and 4½-inch stroke. The model 30 is a continuation of last season's model and has a four-cylinder motor 4 by 4½, using the Overland foot-controlled planetary transmission. The two new models have departed from this to the selective gearset bolted to the rear axle housing. All models are equipped with gear-driven magneto ignition with a separate coil and battery system as well. These models are shown with runabout roadster, baby tonneau and touring car bodies fully equipped and ironed for tops.

Reliable Dayton—The Reliable Dayton Motor Car Co. is in the market with three models, a 15-horsepower motor buggy with 40-inch wheels and 84-inch wheelbase; a 20-horsepower surrey with 40-inch front and 42-inch rear wheels, a wheelbase of 103 inches, and a motor delivery wagon. The motors of these cars are of the two-cylinder opposed type, water-cooled, with integral heads, valve chambers and water jackets. The cylinder bore and stroke are 4¾ by 4 inches for the 15-horsepower motor and 5½ by 4½ inches for the 20-horsepower. The valves are mechanically operated from one camshaft, and the push rods may be removed with the cover of the crankcase. Connecting rods are of drop-forged steel with nickel

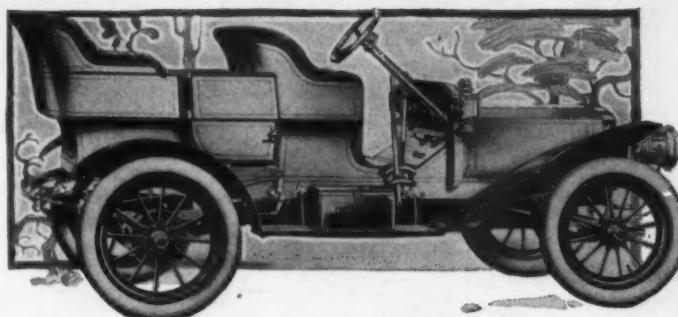


MOON FOUR-PASSENGER ROADSTER CAR

babbitt crankshaft bearing and phosphor bronze wristpin bushings. The crankshaft is drilled for lubrication purposes. The crankshaft bearings are of Parson's white bronze. The cooling system is comprised of continuous fin vertical tube radiator, gear-driven, gear pumps and fan flywheel. Lubrication is by means of a mechanical belt-driven four-feed oiler. A float feed carburetor is used, and a gasoline tank of over 10 gallons capacity is located under the seat. Ignition is jump spark, dry cells, and coil on dash. Control is by means of spark and throttle on the steering column independent of the steering lever. The transmission is sliding gear, two speeds forward and one reverse, Hyatt roller, ball and bronze bearings. The clutch is of external contracting band on drum or flywheel. These are operated by foot pedal. Side chain drive is used and there are semi-elliptic front and full-elliptic rear springs, two sets of internal expanding band brakes applied to drums or rear hubs, and operated by foot pedals.

Mora—Particularly attractive in the Mora line is the light four and light six, both of which are fitted with different body styles. In design they are much alike, both being fitted with a unit power plant, in which the motor base and gear-box base are bolted together at their adjacent ends and together form the bearing support for the crankshaft and gear-box shafts as well as serving in the capacity of a mud apron. The wood type of frame heretofore used in the four-cylinder is replaced by a channel construction. The propeller shaft is encased in a tubing; the only universal joint of the transmission is in the rear of the gearbox. The car carries a Mora carburetor and the motor is fitted for magneto ignition. The puller driving fan is now located in rear of the half-time housing, which eliminates the necessity of piercing the front cover of this housing.

Mitchell—One of the first factories to manufacture low-priced four-cylinder cars was the Mitchell Motor Car Co. This year its models are shown in 20, 30 and 40 horsepower. Several improvements over previous years' products are noted, chief of which is the adoption of the selective gearset in which the shafts rotate on roller bearings instead of plain bearings as heretofore. Vanadium steel also is employed for the gears and shafts. This motor of the Mitchell type, with a water-jacketed exhaust valve in the head and mechanically-operated intake valve in the side, operated by the same camshaft. It is equipped with a magneto fastened to a bed piece integral with the crankcase. In addition to this magneto is the regular battery outfit operated through the magneto distributor to the one set of spark plugs.



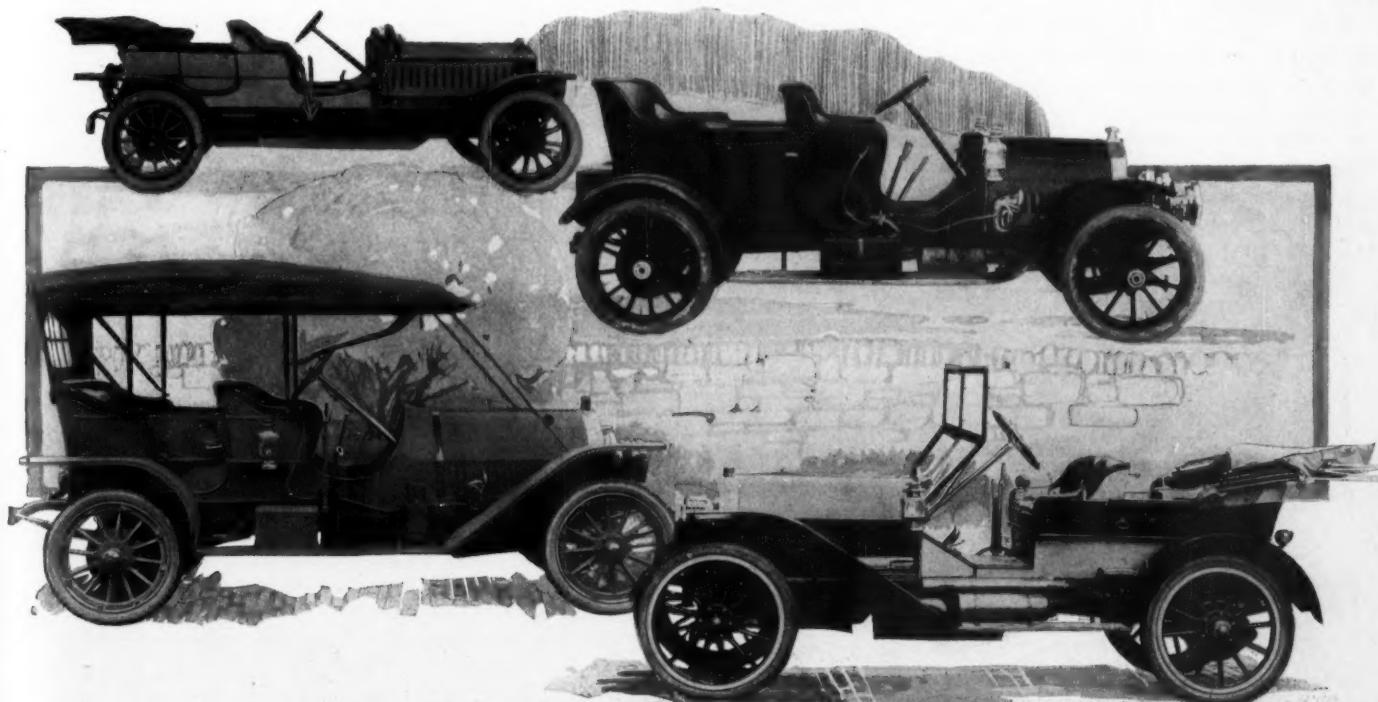
MITCHELL AS A TOURING CAR

In the 40-horsepower model a platform spring is used at the rear and the same elliptic springs in all models are attached to the spring seat of the axle, a little off center, making the spring shorter in front of and longer in the rear of each axle. A variety of bodies is shown on these chassis models.

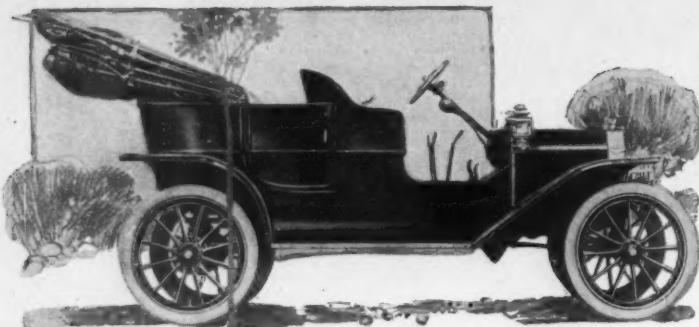
Austin—In the high-priced, high-powered class belongs the cars of the Austin Automobile Co. Three chassis models are shown of 45-50, 50-60 and 60-90 horsepower respectively. The 45-50 is a six-cylinder model with $4\frac{1}{4}$ by $4\frac{1}{2}$ -inch cylinders, the 50-60 has four cylinders of $5\frac{1}{2}$ by $5\frac{1}{2}$ -inch bore and stroke, and the 60-90 has six cylinders of $5\frac{1}{2}$ by $5\frac{1}{2}$. These models are equipped with two complete ignition systems—one from magneto and the other batteries and coil, each independent of the other. The selective gearset with multiple-disk clutch with a shaft drive is used on all the models. These chassis are furnished with any type of body desired.

Schacht—The model K Schacht is an 18 to 20-horsepower motor buggy type with a friction transmission, the two-cylinder opposed motor being carried transversely just in front of the back axle and the friction transmission is in front of it. The forward end of the crankshaft carries a friction disk which contacts with the sliding friction wheel on the jackshaft. This friction wheel slides on a large diameter drum within which is carried the differential. The car uses chain drive, has a 74-inch wheelbase and is fitted with solid rubber tires.

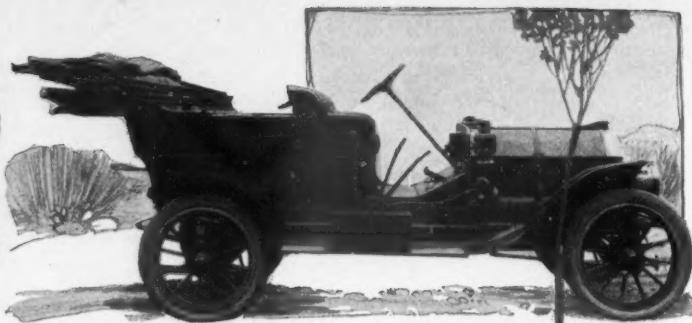
Gaeth—Gaeth cars are characterized by a low-tension make-and-break ignition scheme, which is characteristic of the designer and consists of a vertical shaft between the twin castings on the left, and which operates four push rods engaging the rocking



AUSTIN AND MORA IN ATTRACTIVE FORM AS SHOWN IN THE TOP PICTURES
SPEEDWELL AND GAETH TOURING CARS CARS, FOUND IN THE LOWER END OF PICTURE



FORD FOUR-CYLINDER TOURING CAR



JACKSON TOURING CAR

electrodes carried in the cylinder head. Another feature is the thermo-syphon cooling, in which the water intake enters the jackets at the left front, instead of beneath the exhaust port. The return flow is from the jackets' heads. A third Gaeth characteristic is the contracting band clutch, in which a leather-faced band acts on a flywheel flange. In the rear of this comes the progressive gearset, which has been used in preference to the selective. A floating rear axle is used.

A-K—The Allen-Kingston Motor Car Co. offers two models, one a 17-horsepower car with a four-cylinder motor for touring and a 48-horsepower chassis with body work to suit. The 48-horsepower motor is with cylinders 5.12 by 6.18 inches bore and stroke respectively. Attention is called to the use of the New Departure ball bearings in the cars to almost the entire exclusion of plain bearings. The 17-horsepower model is of the type involving *en bloc* cylinder castings. Left-hand steering is used. This model is especially designed for maneuvering in congested streets and can turn in an ordinary street.

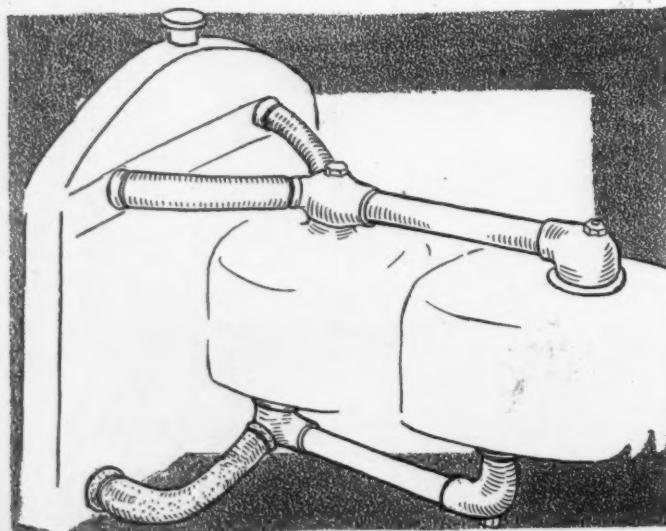
Pennsylvania—No material changes are being made in the 1909 Pennsylvania product excepting that 4-inch front tires are used instead of 3½-inch sizes and the rear side springs are increased 3 inches in length. This type C car is made throughout of 3½ per cent nickel steel with angular bearings in every part except the motor. It is fitted with die cast fittings. In addition to this is the type E seven-passenger car, which is practically the same but has 122-inch wheelbase. A newcomer, however, from this factory is the six-cylinder car, using two additional cylinders of the four-cylinder models. This car has 138-inch wheelbase and is only fitted with toy tonneau bodies.

Ford—Probably no other manufacturer shows a greater change between the models of 1908 and the present models than does the Ford Motor Co. While to outward appearance the lines of the car remain the same, a great difference is perceptible in the power plant. There is only one chassis model, but there is a range of seven bodies to be selected from. The motor is now cast *en bloc* and the lower part of the crankcase is integral with the transmission and flywheel

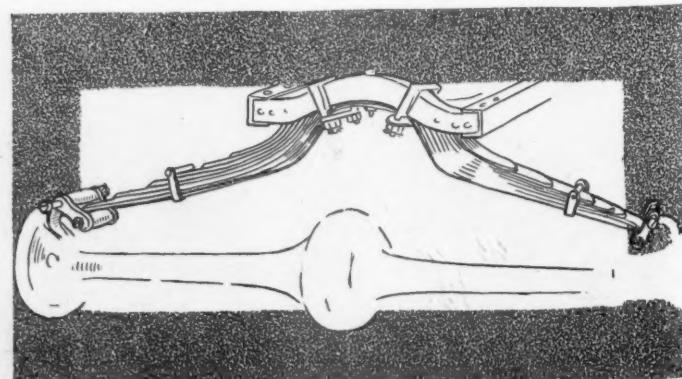
case. The cylinder heads are a separate unit from the cylinders, and the four heads, which are water-jacketed, are in one piece. By the removal of twelve nuts it is possible to take off this head and remove the pistons. Another novel construction is the low-tension magneto which is incorporated in and is a part of the flywheel. This magneto has no commutator, brushes, gearing, contact points or moving wires and the only rotary member is that attached to the flywheel. The stator carrying the coils, in which the currents are generated, is a stationary spider permanently attached to the engine and the whole is enclosed in the flywheel casing. The slightest movement of the flywheel generates sufficient current to make a powerful spark. Another novel feature of Ford construction is the transverse rear spring used instead of the usual two side springs. Heat-treated Vanadium steel enters largely into the construction of this model, being used for axles, shafts, springs and gears.

Jackson—With the continuation of two of last year's models, the Jackson Automobile Co. will show two entirely new models of popular-priced cars. The favorite seems to be model H, a medium-price car driven by a 30-horsepower four-cylinder motor which is of the conventional L design, with the cylinders cast in pairs. The thermo-syphon cooling system, which has been a feature of the Jackson line, is still used. This motor has the double ignition, one of which is by magneto. Another new car in the line is the model K, a low-priced two-cylinder opposed shaft-driven car, with the motor placed transversely under the hood. This motor, with a 5-inch bore and 4-inch stroke, is rated at 18 horsepower. Model E is similar to last year, the only difference being in the matter of refinement. Model C, the remaining model of this line, shows little change. On any of the above chassis the choice of bodies ranges from the roadster to the detachable tonneau and touring car.

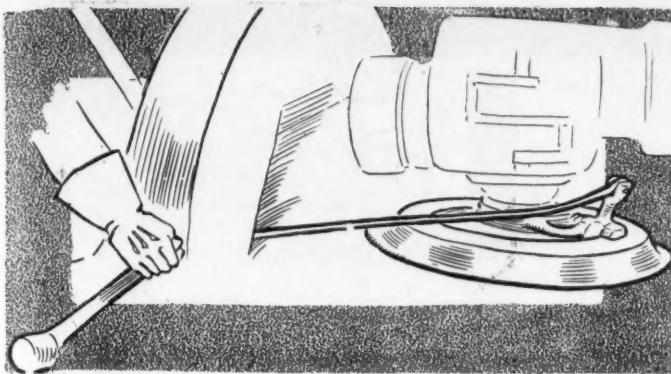
American Simplex—Another enthusiastic exponent of the two-cycle principle is found in the Simplex Motor Car Co., which is showing one chassis model equipped with various body types. The power plant of this model consists of a four-cylinder two-cycle motor, with 5 by 5-inch bore and stroke, and rated at 50 horsepower. The ignition is effected by two complete systems, one a Bosch magneto driven by bevel gear from a transverse shaft, which also drives the water pump and commutator and fan. The commutator is placed horizontally on the top of a vertical shaft at the front end of motor. The gearset case is integral with the rear



THERMO-SYPHON SYSTEM IN REGAL CARS



FORD TRANSVERSE REAR SPRING



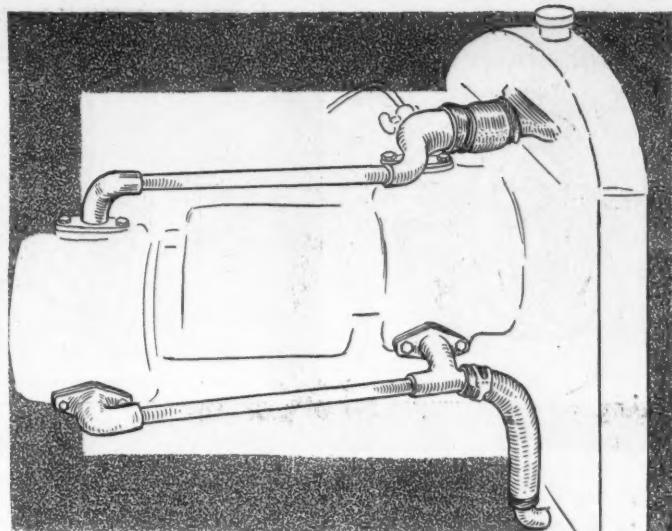
LEVER CRANKING METHOD ON GYROSCOPE

axle and is of the selective type. D. W. F. annular ball bearings are used at all points except the motor. The bodies are of pressed sheet aluminum and are large and roomy.

Cameron—In these days when water-cooling is supreme and arrogant in its supremacy it really is refreshing to come across an air-cooled motor now and then, particularly if this be a low-priced car of marked simplicity intended for the man of very moderate means and equally moderate mechanical ability. To such people the car made by the Cameron Motor Car Co. will appeal with a peculiar force. It is now built in both four and six-cylinders, with runabout, roadster and touring car bodies. The transmission, although affording direct drive on all three forward speeds, is simple. Located on the rear axle, it is an exclusive Cameran feature, this company holding patents which cover it thoroughly. These cars are very light in weight, varying from 1,100 pounds in the four-cylinder runabout to 1,650 in the six-cylinder touring car.

Moline—Two models of western manufacture are the Moline K and M, to be shown by the Moline Automobile Co. The model M is a low-priced four-cylinder car, rated at 24 horsepower. The cylinders are cast in pairs with valves on one side and have a 3 $\frac{7}{8}$ -inch bore with 4 $\frac{1}{2}$ -inch stroke. This model is furnished with either shaft or chain drive. The shaft drive gives a 10-inch road clearance against a 14-inch road clearance for the chain drive. Model K is a higher-powered car, employing a 4 $\frac{1}{2}$ by 5-inch bore and stroke and rated at 35 horsepower. This model has a selective gearset and cone clutch, the whole forming a unit power plant with the motor. The magneto on this motor is placed transversely and is driven by a transverse shaft, which also drives the water pump. The commutator is placed on top of a vertical shaft at the front end of the motor and is very accessible. This model is to be shown with a touring body as well as with a four-passenger roadster and baby tonneau.

Kisselkar—The 1909 menu of this Wisconsin concern comprises three models; a 36.1-horsepower car in touring and roadster styles, the motor having a 4 $\frac{1}{4}$ -inch square cylinder. This is an old model. One of the two new models is a 30-horsepower five-passenger car, with surrey or roadster options, and having a 4 $\frac{1}{4}$ -inch square motor.



THERMO-SYPHON SYSTEM ON GYROSCOPE CAR

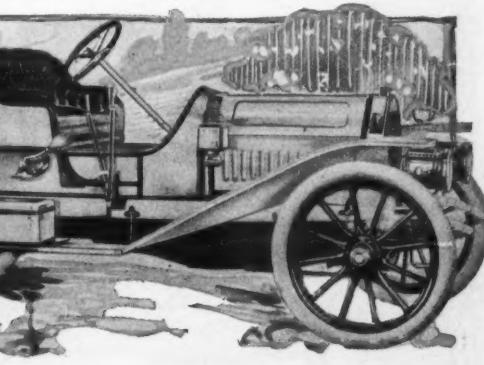
The second new member is the 60-horsepower, six-cylinder car, with 4 $\frac{3}{4}$ -inch cylinders, and carrying a seven-passenger body. All models agree in design, which incorporates L motors with twin castings, selective gearset, and shaft-drive. On the large models magneto and Atwater-Kent ignition systems are used. The evolution of the car compared with last year's models shows increase in wheel sizes, lengthened wheelbases, increased brakes, and the more general employment of drop forgings. The popular three-quarter rear elliptic springs find a place in their make-up.

Chadwick—The builders of the Chadwick cars always have been consistent advocates of the high-powered machine, and their line for the coming season shows nothing smaller than the 60-horsepower, six-cylinder chassis which made such an excellent showing in the leading racing contests of the past year, while it carried off top-line honors at practically every hill-climb of importance in which it was entered. The efforts of both the designer and factory have always been concentrated on the production of a single type of chassis, which has accordingly been brought to a high state of perfection. The Chadwick is probably the only car ever built that has the distinction of being regularly fitted with two high-tension magnetos as a standard part of its equipment. It has embodied numerous other distinctive features, such as the copper waterjacket encircling each one of the twin-cylinder castings, thus making the cooling of each pair of cylinders very uniform and at the same time independent of the others. Three types of bodies are listed, seating two, five and seven passengers. It uses side chain drive with encased chains.

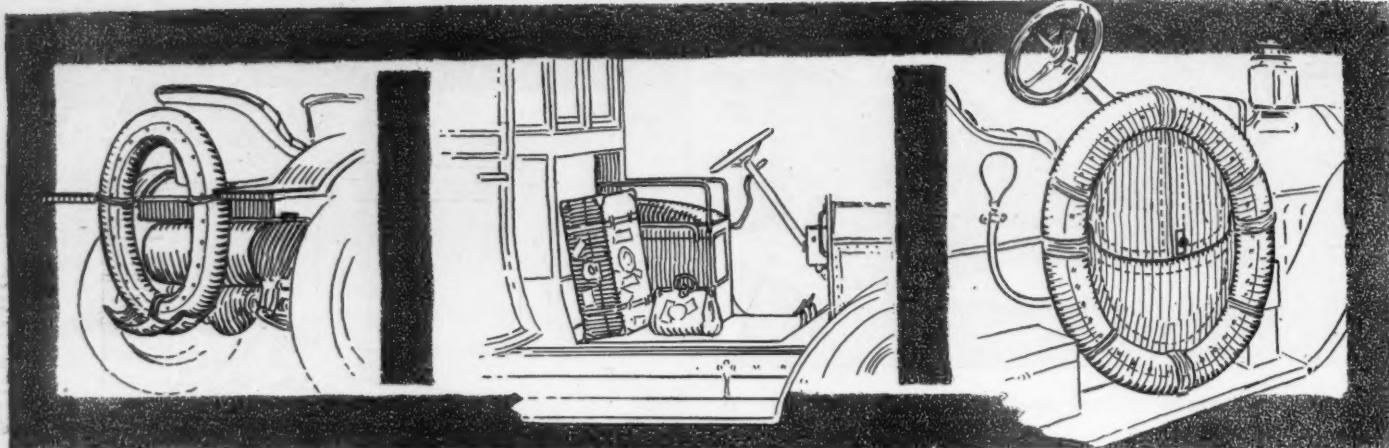
Sharp-Arrow—There have been no changes in the 1909 model of the Sharp-Arrow. The several special points of interest which are worth noting in this runabout are the clutch, position of driver and general design of car as a whole. The clutch is novel from the fact that any unusual tension, when the clutch is



KISSELKAR TOY TONNEAU



THE 1909 MOLINE TOURING CAR



TONNEAU TIRE CARRIER

THE ATLAS TAXICAB

SIDE TIRE CARRIER

applied, does not in any way affect the transmission. It is leather-faced and has very wide engaging surfaces. The motor is set low and is of the water-cooled cast-in-pairs type. The gears are of the usual three-speed forward and reverse and are of chrome nickel steel, all mounted on Hess-Bright annular ball bearings. The cylinders are 5 by 5 and are capable of a speed of 1,600 revolutions per minute. The lubrication is entirely splash; however, an arrangement has been made in the crankcase for filtering the return oil, which is brought back into compartments beneath the cylinders. The wheelbase is 106 inches, and 36 by 3½ and 36 by 4 front and rear tires respectively are fitted.

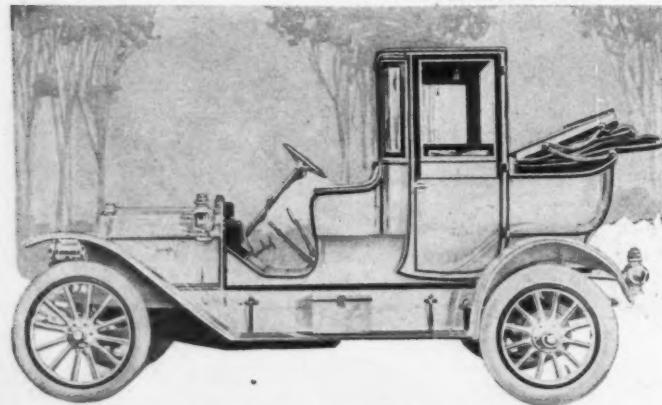
Middleby—The new product of an old factory might be a good designation for this car. It is built in the factory formerly occupied by the Duryea Power Co. by the Middleby Auto Co. The firm is entering the field of low-priced four-cylinder air-cooled cars. This motor is of the three-valve type, having two exhaust and one intake valve. The main exhaust valve is located at the lower part of the cylinder and is cam-actuated. The other exhaust and the intake valve are in the head of the cylinder and are operated by walking beams and push-rods. A trussed wood frame, full-elliptic springs and semi-floating rear axle are used. A leather-faced cone clutch and progressive gearset determine the gear ratios. This chassis model is furnished with either a runabout or surrey body, as desired.

Atlas—In the Atlas cars, manufactured by the Atlas Motor Car Co., is seen another exponent of the two-cycle motor. This line consists of two chassis models—one with a two-cylinder and the other with a three-cylinder motor. The cylinders are all 4½ by 4½-inch bore and stroke, and all rated at 20 and 30-horsepower respectively. A new feature is the adoption of the thermosyphon cooling system applied to the two-cycle motor. The ignition system used is the Atwater Kent generator. An external band clutch and selective gearset is used to transmit the power for the motor to the driving wheels. Timken roller bearings are used in the divided rear axle, also in the front wheels. Three-

quarter elliptic springs rear and semi-elliptic front absorb the road shocks. These models are shown with runabout, roadster, touring car, town car and taxicab bodies.

Moon—Three years ago a motor with valves in the head operated by single cams for each pair of valves, and these cams on an overhead camshaft, attracted considerable attention on account of its novelty. This is the third year the Moon Motor Co. has shown this type of motor with very slight modifications. This design calls for a very compact simple motor with intake and exhaust manifolds on opposite sides. Another neat feature is the ignition system current, by means of a high-tension Bosch magneto bolted to a bracket on the forward end of the crankcase, the four wires from which leads an insulated tube bolted on the side of motor and connecting to the spark plugs through knife switches. To counteract any disadvantage that may be attributed to this magneto system a very simple but effective starting device is employed. With this it is possible to start the motor from the seat without any other agency than the magneto itself. A simple device is used to disengage the magneto from its driving gear and to throw the armature to form a contact. After the first explosion the magneto automatically drops back into gear. This device is original with the Moon company. This firm has two chassis models which differ only in wheelbase and diameter of wheels. These cars are shaft-driven and are among the few American cars having the rear wheels cambered. The frame has an upsweep of 3½ inches at the rear to permit the use of full elliptic springs at that point and gives a low center of gravity without interfering with the road clearance.

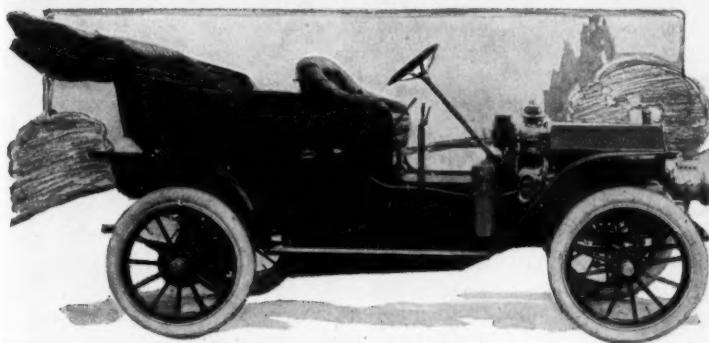
Midland—The Midland Motor Car Co. lists two models for the coming season, one a 25-30-horsepower car and the other a 35-horsepower machine. The former is known as model E and is equipped with a four-cylinder vertical motor, the dimensions of which are 4½ by 5 inches, while the latter is termed model G and has a 4½ by 5½-inch motor. Model E has a three-speed selective change speed gear. It has a disk clutch, nut-and-screw type of steering gear, two sets of brakes on the rear wheels and



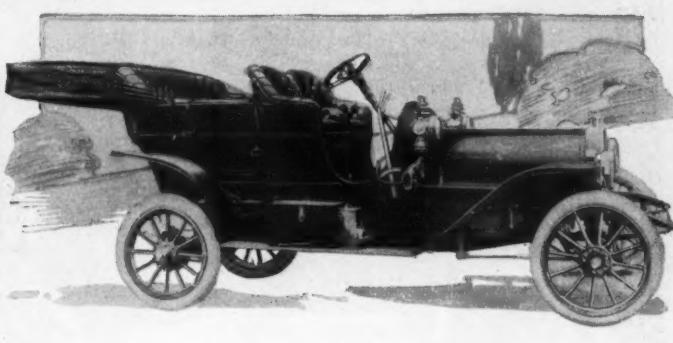
THE ATLAS TWO-CYCLE TAXICAB



THE MOON LANDAULET TYPE



TWO-CYLINDER REO TOURING CAR



LAMBERT MODEL 19 TOURING CAR

is equipped with 34 by 3½-inch tires all round. The wheelbase is 110 inches. Model G is a larger car, made in both touring and roadster types. Its motor dimensions are 4½ by 5½ inches, developing its rating of 35 horsepower at a moderate speed. The remainder of its design is along practically the same lines as the smaller car, but proportionately larger, the wheelbase being 112 inches and the tire equipment 34 by 4 inches all round.

Lansden—The name of Lansden has been chiefly associated with commercial types of electric vehicles, employing the Edison alkaline storage battery as the source of current, though pleasure vehicles have been made by this firm from time to time. In its business of turning out commercial vehicles, the Lansden company has naturally devoted its attention to a range of types as extended as the wants of its numerous customers. For the 1909 season there will be added an electric brougham and a taxicab type of attractive lines, the latter naturally being available also for private use as a town car.

Reo—Three Reo models are listed for 1909, a 20-horsepower two-cylinder touring car, a roadster body mounted on the same chassis, and a 10-horsepower single-cylinder runabout. The 20-horsepower chassis is identical with last year's excepting that the wheelbase has been increased from 94 to 96 inches. The Reo motor is of the long-stroke class, the stroke measuring 6 inches and the bore but 4¾. A feature of the Reo car is the multiple radiator construction, which permits of replacing a part or the closing up of a certain part should it become damaged without interfering with the circulating portion of it. The touring car body has been increased from a comfort point of view.

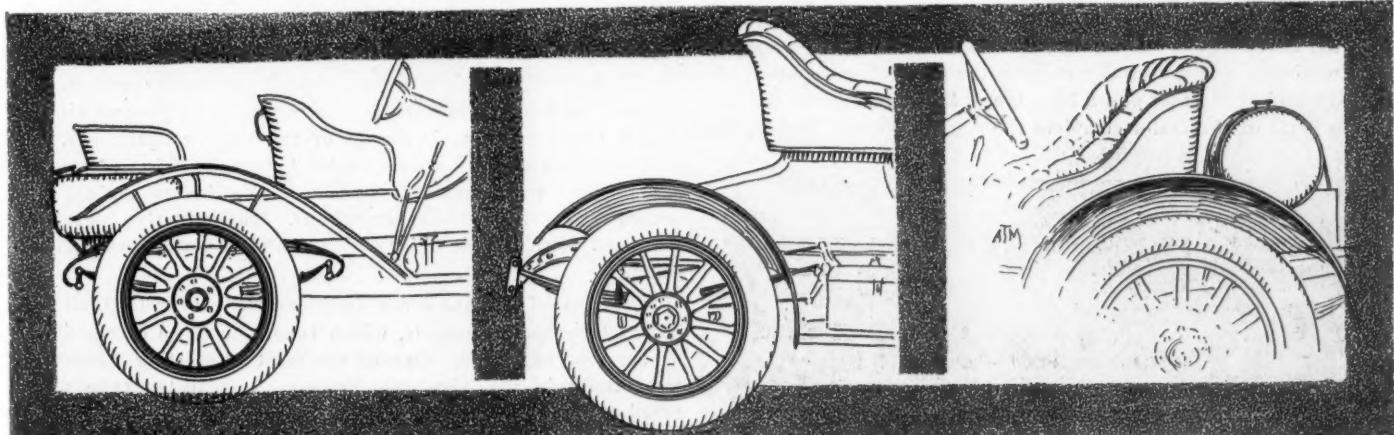
Lane Steamer—For 1909, there will be two of the Lane steam chassis listed, one rated at 20 horsepower, and the other at 30 horsepower. On the former there will be shown a three-seated roadster type and a five-passenger touring car. On the larger chassis there will be a Lane roadster, a close-coupled four-passenger car, and a seven-passenger touring car. The features that have always characterized Lane construction during the past 9 years have been retained, the power plant consisting of the combination fire-tube and coil generator under the bonnet, at the forward end of which the condenser is carried. The engine is a two-cylinder compound placed in a sloping position under the

footboards and driving to the rear axle by means of a single chain. A simple device is employed by means of which the high pressure steam may be employed in both cylinders when extra power is needed.

Cartercar—The Cartercar company will show one chassis model of the friction-driven Cartercar. This model, which is very similar to last year's, shows improvement in the matter of refinement more than in any radical manner. Among the changes noted is the practice of arching the frame to give greater spring action over the rear axle. The motor is a two-cylinder opposed, 4¾ by 4½-inch bore and stroke. The bearings in this motor have been made wider, thereby insuring longer life. It is noticeable that the driving chain has been housed in a dirt and oil-proof case, where it runs quietly in a bath of heavy oil. This chassis is furnished as desired with a delivery car, folding tonneau, roadster, taxicab or landaulet bodies. As previously, the friction transmission consists of a disk on a continuation of the motor shaft, which disk, through attachment by a three-arm spider and studs to the flywheel, can be moved backward to contact with the friction wheel on the cross-shaft.

Marion—Numerous features of design characterize the Marion motor. The cylinders are cast independently and are of the T type, having the valves oppositely disposed in outboard ports; two camshafts are used. The gear pump for circulating the water and the ignition timer are both located on the forward end of the motor in accessible locations. The carburetor is a Schebler with automatic piston throttle, and high tension ignition is employed, a 6-volt 60-ampere hour set of storage cells supplying the current with a set of dry cells for emergency use on the four-cylinder Marion, while a magneto will be specified on the six-cylinder car. The clutch is of the multiple disk type, while the change-speed gear is a selectively operated sliding set.

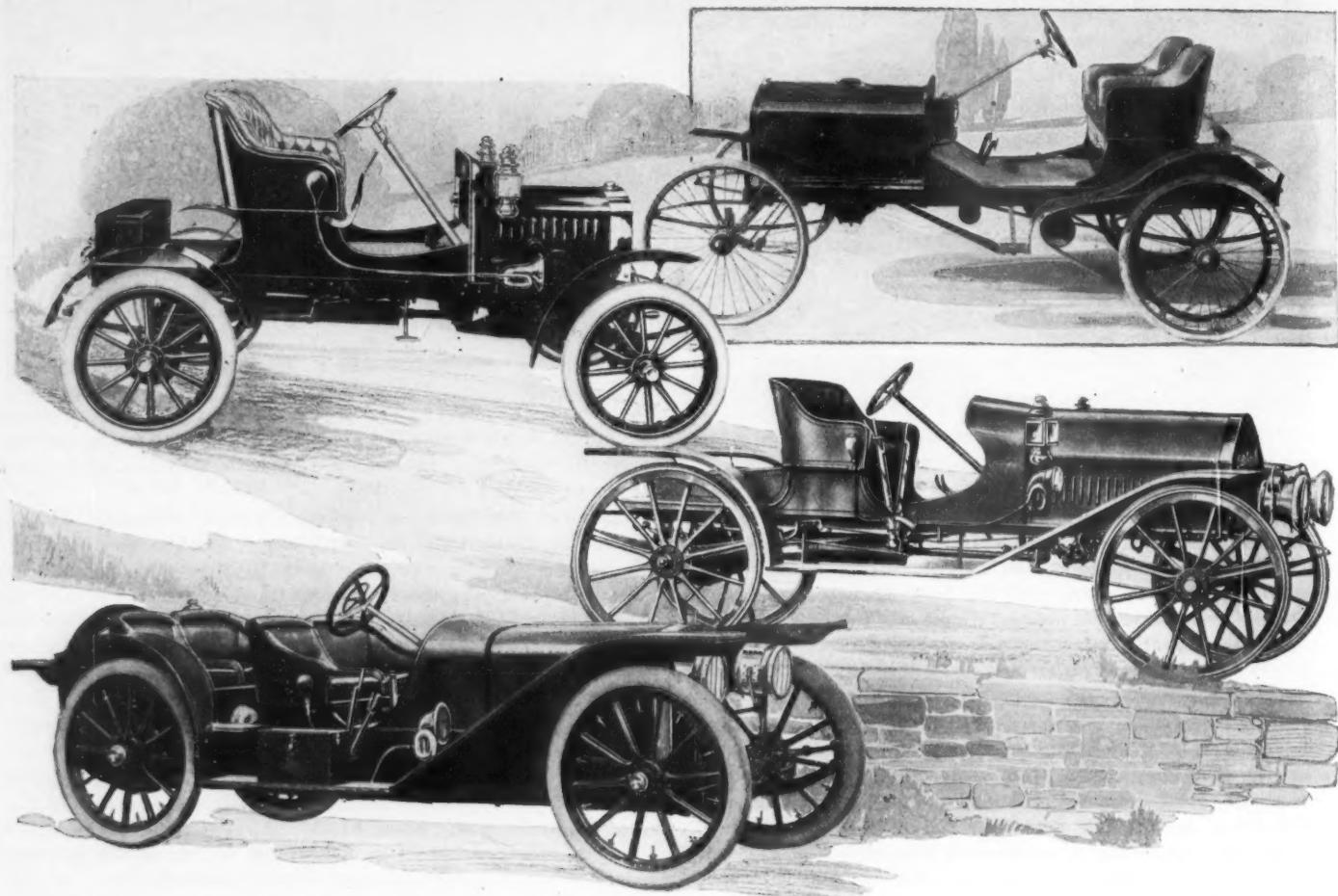
Gyroscope—This is the product of the Blomstrom Mfg. Co. The two-cylinder horizontal opposed motor is placed parallel with the side members of the frame, being supported on two special transverse members located under the bonnet. By removing two bolts the entire power plant can be taken out complete. The flywheel is of unusually large diameter and runs in a horizontal plane beneath the cylinders, thus giving rise to the name. At



RUMBLE ON GASOLINE TANK

MITCHELL REAR FENDER

ATTACHING REAR GASOLINE TANK



NEW MAXWELL JUNIOR IN UPPER LEFT
AMERICAN TRAVELER WITH 40-INCH WHEELS

TOY BROWNIEKAR IN UPPER RIGHT
BLACK FOUR-CYLINDER, AIR-COOLED MOTOR BUGGY

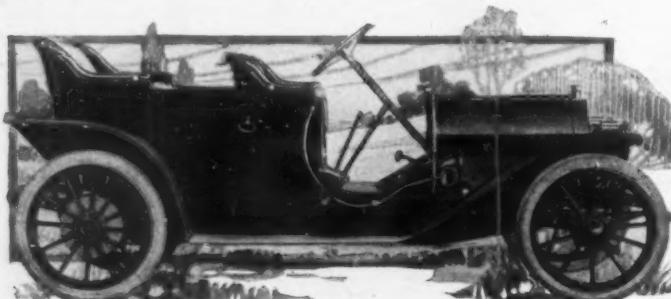
right angles to the flywheel and so arranged as to contact with the under face of it is a friction wheel, sliding on a squared shaft, an extension of which constitutes the propeller shaft of the car, thus giving a straight line drive. By moving this friction wheel backward or forward across the center of the flywheel an extensive range of gradually increasing or decreasing forward or reverse speeds is obtained. By means of a small friction clamp on the rim of the flywheel the motor may always be started from the seat through the medium of the side lever. An interlocking device connected with the spark advance eliminates all danger of a back fire.

Black—The Black Mfg. Co. is marketing a high-powered high-wheeler with solid tires, weighing 1,800 pounds and for which a speed of from 4 miles up is claimed. The motor is of the four-cylinder type, with 4½ by 5-inch bore and stroke. Cylinders and cylinder heads are detachable and air-cooled. The exhaust and intake valves in the head are mechanically operated by means of a rocker arm and from one camshaft. An automatic exhaust valve situated near the base of the cylinders reduces the back pressure to a minimum and materially reduces the heat of the motor. A fan flywheel at the rear and a high-speed, ball-bearing, belt-driven fan in front of the motor complete the cooling system. The clutch

is of a special double contracting-band type, metal-to-metal, and runs in oil. The transmission is of the sliding clutch selective type, three speeds forward and one reverse. Direct drive is on high with the countershaft and all gears remaining idle although in mesh. The control is by means of the change-speed lever and emergency brake lever at the side, and two foot levers, the left foot operating the clutch and right the brake. The brakes are of the internal and external contraction type on the hubs of the rear wheels. The motor control is by means of spark and throttle levers on stationary quadrants above the steering wheel. The steering gear is of the regular worm gear type with a 16-inch wood-bound steering wheel. The ignition is the jump spark system with vibrator coils, batteries, magneto and one set of plugs.

Speedwell—Among the newcomers to the national shows, although in its third season, are the models of the Speedwell, built by the Speedwell Motor Car Co. This firm shows one chassis model for the different types of bodies. Among the changes from last year's product are noted a slightly increased wheelbase and semi-elliptic rear springs. A single-piece pressed steel rear axle of the floating type is a change from the previous models. The gearset has been provided with stuffing boxes to prevent oil leaks and a Bosch magneto is a part of the regular equipment. The motor of this car is a four-cylinder L-shaped engine of standard type, with double ignition system. The cylinders are 4½ by 5 inches and rated at 40 horsepower. The selective gearset is equipped with Timken roller bearings and also are the wheels and axles.

American—There are seven American models for 1909, all fitted with 50-horsepower motors, which takes the place of the 40 size of the present season. One of the most interesting members of the family is the American Traveler, a roadster type of car fitted with 40-inch wheels in place of the generally used 36-inch sizes and having the underslung frame. This car has a wheelbase of 122 inches long, which is 10 inches in excess of that gen-

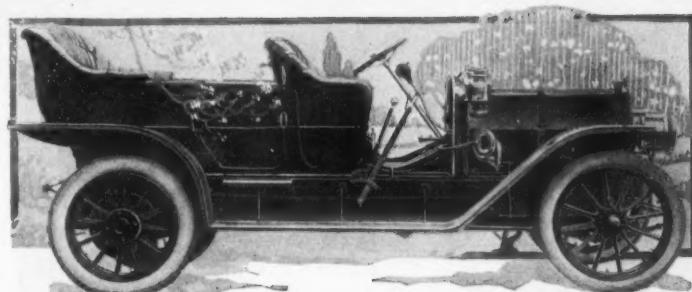


MARMON SMALL FIVE-PASSENGER CAR

erally used on the American roadsters. The use of 40-inch wheels gives a 12½-inch clearance beneath the mud apron. The American tourist cars are built in five and seven-passenger touring line. The motor employed in all of them is of the L twin casting type. On the Tourist a sub-frame is not used, but one is required on the roadsters with the underslung frame. Two independent ignition sets is employed, one being a Bosch magneto. The company continues the use of its leather-faced cone-clutch.

Regal—The Regal is a car belonging to the medium-priced class, which is just entering its second year, and is built by the Regal Motor Car Co. It is shown with a roadster and touring car body, for both of which the same chassis is used. The car is driven by a four-cylinder motor of L design, with all valves on one side, and operated by cams integral with the camshaft. The cooling is of the thermo-syphon type, by which the water is received at the lower part on the non-valve side of the motor and is carried off from the top and distributed to each side of the radiator. The lubricating system of this motor is unique and is the subject of a descriptive article under that heading in this issue. The selective gearset is at the rear axle and is bolted thereto. The driving shaft is received at the gearset through a torsion tube, which is reinforced by V-shaped strut rods.

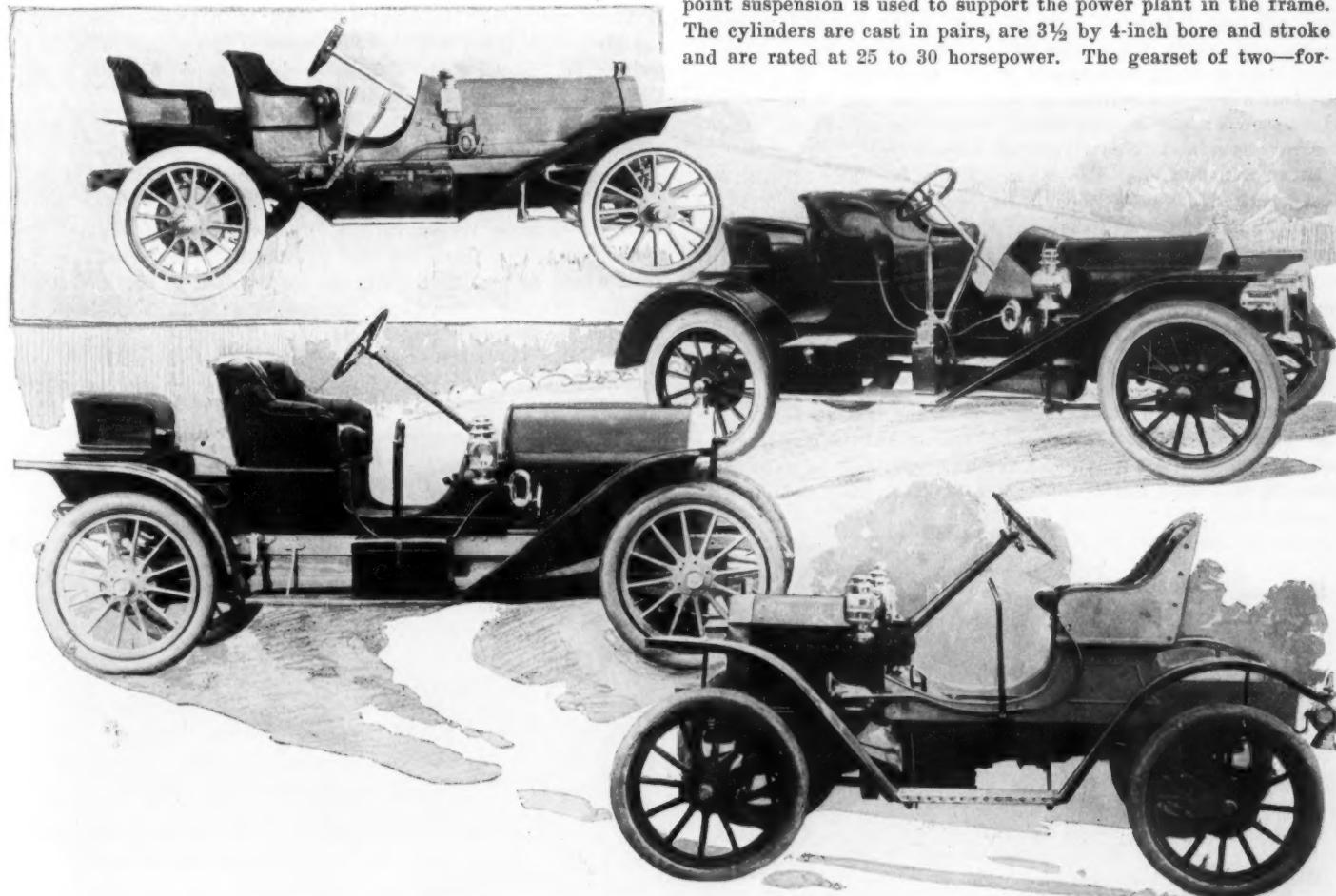
Marmon—Of particular note in the Marmon line is the new 32-horsepower four-cylinder small cars with 4½ by 4¼-inch cylinders cast in pairs. In this car the selective gearset made by the company is a unit in connection with the rear axle and instead of the multiple-disk clutch heretofore used a contracting band type is employed. The frame is a conventional one instead of the double three-point suspension type introduced by this company. The well-known Marmon lubricating system is continued with slight changes, and an innovation in the motor is the tubular crankcase with end plates for taking the crankshaft bearings. The motor is supported at three points—in front on a trunnion and in the rear on tubular cross pieces passing through

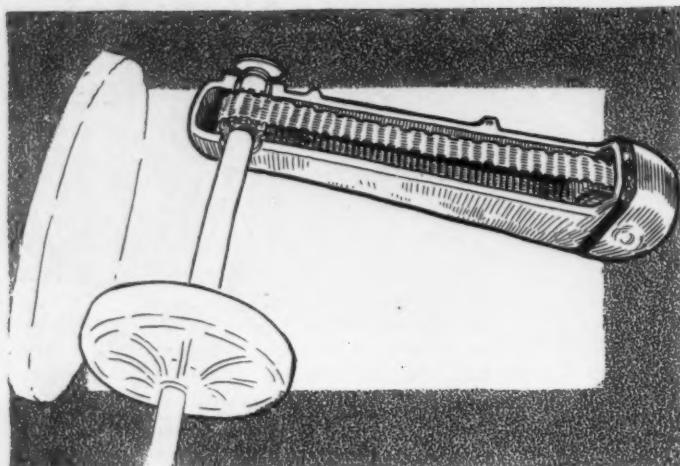


MARMON 50-HORSEPOWER TOURING CAR

an eyehole in the rear of the crankcase. A Jewell ignition system is fitted. On this car, as well as on the large Marmon, the new style of double expanding rear brakes is employed, in which the expanding shoes are carried side by side. A worm and sector adjustment feature is used. The frame is dropped in front of the rear axle and full elliptic rear springs with scroll ends employed. In addition to this the 50-horsepower Marmon big car is continued. The motor valve action includes horizontal levers within the crankcase interposed between the cams and bottoms of the valve stems. The rear axle construction in this car is the same as in the small one with the exception that the transmission is located amidship.

Benner—A newcomer in the motor car manufacturing field is the Benner six, shown by the Benner Motor Car Co. As its name implies, this exhibit is confined to six-cylinder motor cars exclusively. One chassis model is shown on which two types of bodies are exhibited, one a racy type and the other a roadster with rumble seat. The power plant of this car is of the single V construction with the flywheel at the forward end. The valves are in the heads of the cylinders and are operated by rocker arms and push rods. Very convenient inspection plates are located on the side of crankcase and are locked by levers of liberal dimensions. Three-point suspension is used to support the power plant in the frame. The cylinders are cast in pairs, are 3½ by 4-inch bore and stroke and are rated at 25 to 30 horsepower. The gearset of two—for

BENNER ROADSTER IN UPPER LEFT
REGAL THREE-PASSenger ROADSTER LOWER LEFTPULLMAN THREE-PASSenger IN UPPER RIGHT
BRUSH TWO-PASSenger RUNABOUT IN LOWER RIGHT



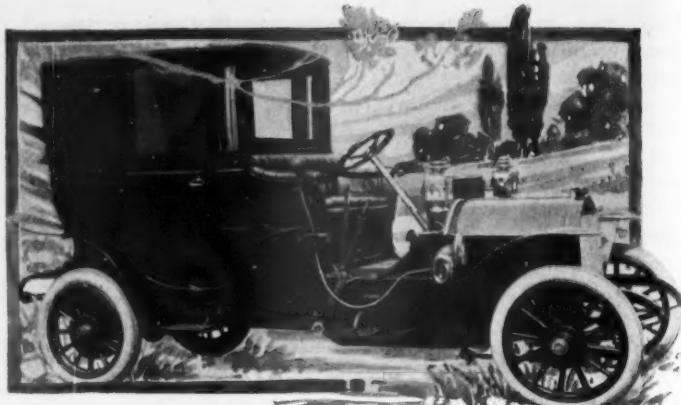
MORSE CHAIN DRIVE OF LAMBERT CARS

ward and reverse—speeds is of the progressive type and receives its power through a multiple-disk clutch. As before stated, this is the first time this car has been placed on exhibition and it probably is the lowest-priced six-cylinder in the show.

Pullman—With a large family of four chassis models the Pullman, manufactured by the York Motor Car Co., makes a very creditable showing. These models are the model K, four-cylinder, with 4½ by 4½ bore and stroke; model L, four-cylinder, 3½ by 3½ bore and stroke; model six-30, six-cylinder, 3½ by 3½-inch bore and stroke; model M, four-cylinder, 5 by 5¼-inch bore and stroke. These models show little difference from the 1909 models, except K, which is a new one. The motors have separately cast cylinders, but with a continuous waterjacket, this construction eliminating the overhead water pipes and simplifying the water connections. A double ignition is used—one of the single unit coil and distributor type, and the other a Bosch magneto to separate spark plugs. The selective gearset and a leather-faced cone carrying cork inserts is used to transmit the power to the rear axle. The lubricating system of this car is the subject of another article in this issue. These various chassis models are shown with different types of body design.

Brush Runabout Co.—Few manufacturers pin their faith to one model and still fewer show a single-cylinder model. Yet the Brush Runabout Co. will show only one model, and that a "one-lunger." This is the same model as the one of a year ago and it still retains such features as wooden axles and frame and spiral springs. The motor, which has only a 4-inch bore and 4-inch stroke, is equipped with counter weights on a gear-driven countershaft. A multiple disk clutch is used in connection with a planetary transmission.

Cleveland Autocab Co.—A newcomer in the taxicab field is the Cleveland Autocab Co. This firm has commenced the manufacture of taxicabs of the four-cylinder vertical type, cast in pairs, and with 3½-inch bore and 4-inch stroke. A multiple-disk clutch is



FIAT TOWN CAR WITH DROPPED FRAME

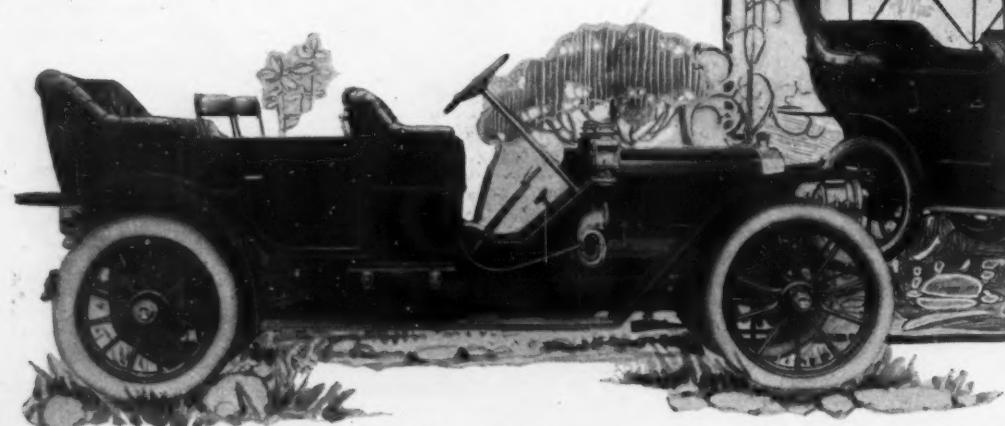
used and the ignition is the high-tension ignition only, dispensing entirely with batteries. Lubrication is effected by a rotary pump, drawing oil from a reservoir in the crankcase, thence into pockets on the three main bearings of the crankshaft. Connecting rods and pistons are lubricated by a splash system. A honeycomb radiator is used in connection with a centrifugal pump. The usual sliding gear selective type transmission is used, having three speeds forward and one reverse. A floating type rear axle, not trussed, is used and is said to be quite strong. Braking service is ample, having a 10-inch drum with 3-inch face. Emergency brakes are on the rear wheels. The steering gear is of the worm-and-sector type and is placed on the left-hand side of the car, while the gear-shifting levers are placed to the right of the driver, thus allowing ingress and egress of the driver without difficulty. This cab has been designed with a view to eliminating such points in the ordinary taxicab as are deemed advisable for comfort and long service.

Anderson—The present interest is in two models, one of which is fitted with solid tires and the other with pneumatics. Both models are provided with a 12-horsepower motor of the two-cylinder type. Model B has a three-speed transmission, while model C is with a two-speed transmission.

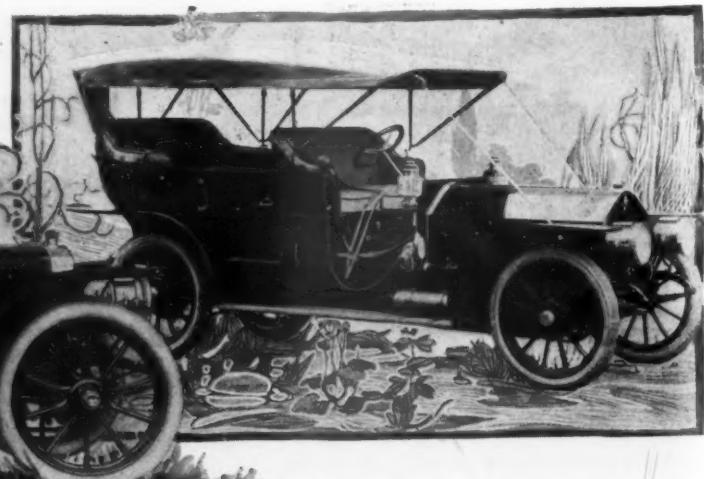
Sultan—This town car has a body that seats six, is fitted with a 10-12-horsepower motor and has a three-speed transmission.

Rambler—Thomas B. Jeffery & Co. will not exhibit at the palace, but will entertain friends and patrons at the New York city branch show rooms, 457-459 Broadway, at which place the entire line of the company can be shown to better advantage than would be possible in a place not devoted to the undivided Rambler interest. For 1909, the company is in a position to enhance an already secure reputation.

Alco—The Locomotive, formerly the Berliet, as made by the American Locomotive Co., would scarcely require any introduc-



SEVEN-PASSENGER AMERICAN TOURIST CAR



ACME SIX REGULAR TOURING CAR

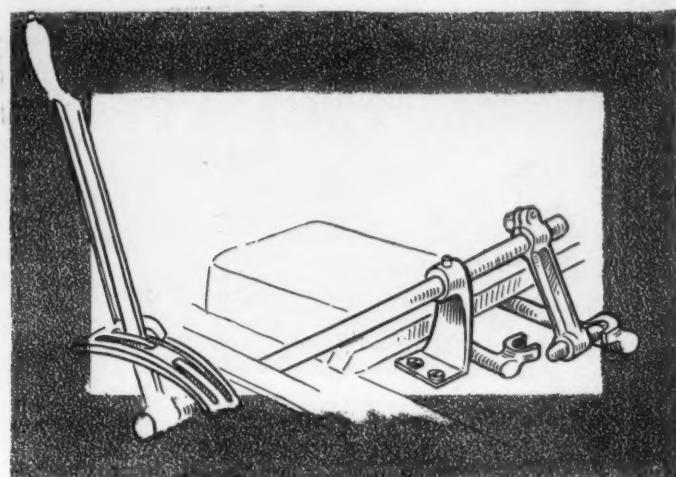


THE 1909 STODDARD-DAYTON LIMOUSINE

tion at all were it not for a desire to remind the patrons of the company of the fact that in addition to the four a six is of the line, and a taxicab also numbers among the good things. The six is rated at 60 horsepower and the cylinder dimensions are $4\frac{3}{4}$ by $5\frac{1}{2}$ inches bore and stroke, respectively. As respects the four, the cylinder dimensions are $4\frac{3}{4}$ by $5\frac{1}{2}$ inches bore and stroke, respectively, for the 40-horsepower model, while the taxicab demands the cylinder dimensions on a basis of $3\frac{1}{2}$ by $4\frac{1}{2}$ inches bore and stroke, respectively. This company is holding to its usual policy of maintaining a separate exhibition, and it will entertain its friends at the Waldorf-Astoria, from January 2 to 23, where the cars can be seen.

Mercedes—The exhibit of the Mercedes Direct Import Co., limited to a 35-horsepower shaft-drive car, in relation to which the body is attracting notice. This body is styled a double phaeton landau, and is one of the first of the kind to come over. In outside appearance the car, enclosed, looks like an ordinary landau with an extension over the driver, and a glass front. However, the body is so built that it can be collapsed and till then take on the appearance of a touring car. This is due to ingeniously folding the top and the dropping of the windows. Incidentally, the Mercedes as a shaft drive will make something of a commotion. The Bosch magneto is used on this car.

Lancia—Italy has always had to look beyond its own confines for an extended market for its motor products, and the United States has provided no small outlet for Italian cars in past years, so that it is quite natural that this new creation from the works of a racing pilot, who is as well known and liked here as in his own land, should be popular in the American market. But even had the car not his prestige to back it, the manner in which the Lancia has performed wherever it has been entered in speed contests would have been more than sufficient to give its name far more than the ordinary prominence, for its work has shown unmistakably that for power, speed, endurance, and regularity of



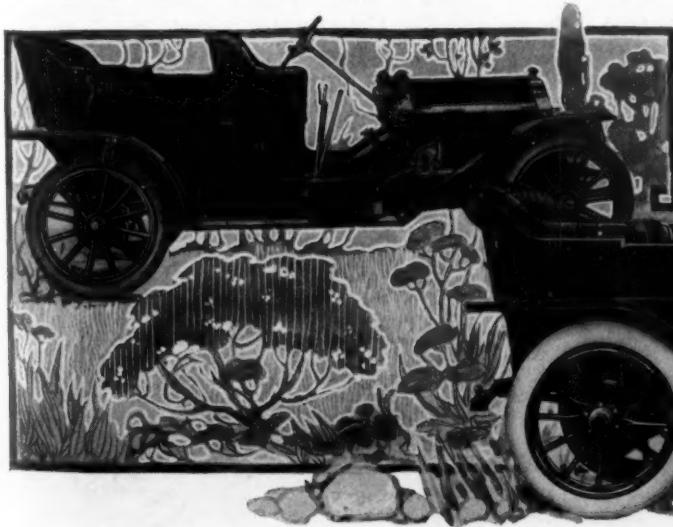
MITCHELL THIRTY SELECTIVE GEAR SYSTEM

running, there are few cars in its class that can approach it. The 12-18-horsepower and the six-cylinder chassis will be shown. The foreign practice of selling the chassis and the body separate is being followed, although models complete with bodies, such as the touring and town car types, are also listed. The list includes the 12-18-horsepower chassis in racing, touring and town car bodies, and a six-cylinder chassis with cylinders the same size as in the 12-18-horsepower model.

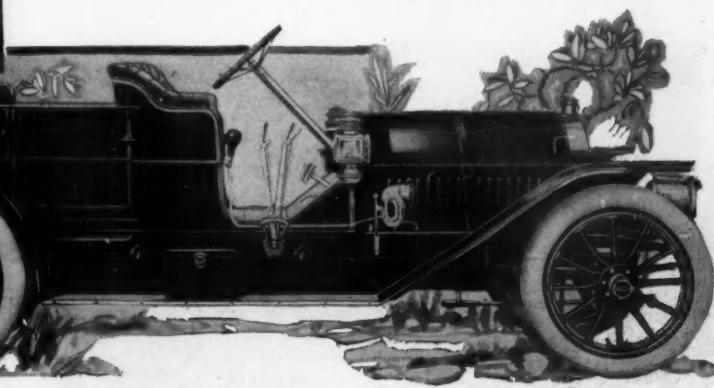
Panhard—Never before has the Panhard been seen in this country in such a variety of models as now. These range from 8 to 80 horsepower, and from two to six cylinders, though naturally by far the greater part of the showing consists of fours. The European policy of listing the chassis alone in every case is adhered to.

Inter-State—The Inter-State car will make its debut to the motoring public at this show. Although a new car, it is of conventional lines throughout, and of the medium-priced order. The four-cylinder motor with cylinders in pairs has a $4\frac{1}{4}$ -inch bore and 5-inch stroke. Dual ignition system is employed, positive water circulation is used, and the lubrication plan is a plunger pump in the crankcase oil reservoir which lifts oil to the crankcase where, it maintains a constant level. The transmission is a selective set carried rigidly on the forward end of the tubular housing of the propellorshaft, and so forming a unit with the rear axle. The front end of the gearbox is supported on a ball and socket joint on a transverse member of the frame. The multiple disk clutch is incorporated in a forward compartment of the gearbox.

National—The National line comprises four models, two of the four-cylinder and the other two six-cylinder models. These models are known as 9-35, four-cylinder, $4\frac{3}{4}$ by $4\frac{3}{4}$; 9-50, six-cylinder, $4\frac{3}{4}$ by $4\frac{3}{4}$; 9-40, four-cylinder, 5 by 5, and 9-60, four-cylinder, 5 by 5, and are built by the National Motor Vehicle Co. The cylinders of these motors are of T design cast in pairs and have ball-bearing crank and camshafts. These cars show little change in minor



INTERSTATE FIVE-PASSENGER TOURING CAR



FOUR-CYLINDER NATIONAL TOURING CAR

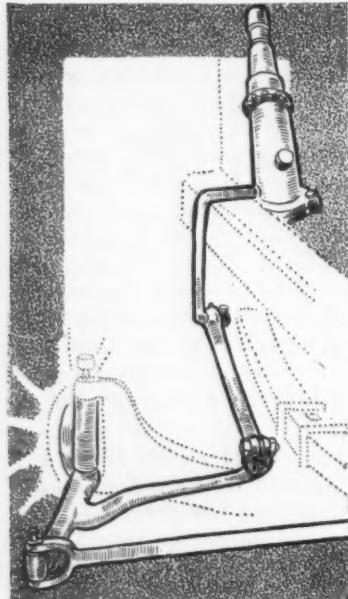


FORD LEFT HAND CONTROL TOWN CAR

details. It is noticed that the wheelbase is lengthened by moving the radiator back of the front axle. Tapered nipples are used on the exhaust, intake and water pipe connections in place of packing. A self-contained leather-faced, spring-cushioned cone clutch and selective gearset is used on all models with D. W. F. annular ball bearings for both main and countershafts. The body equipment furnished on the models to suit the purchaser.

Hotchkiss—The Hotchkiss Import Co., American agent for the well-known French artillery makers, will put forth a greater effort for business in this country during the coming year than previously, as is shown by its exhibit. It is one of the first import agents to adopt the American plan of listing its cars complete with body, the models shown including touring, toy tonneau, town car and other enclosed types with both four and six-cylinder motors.

Isotta—In order to be in a position to meet the demand for an extended range of powers, the Isotta Import Co., American agent for the Italian builders of the Isotta, is showing a line of models from 14 to 50 horsepower. These are the 14-20-horsepower chassis, the 18-24, the latter having a slightly longer wheelbase, but being otherwise the same; the 15-25-horsepower, the 40-45, and the 50-65. With the exception of the 15-25-horsepower model, all are four-cylinder types. This car has placed itself so prominently before the public through its highly consistent performance in every racing event in which



STODDARD STEERING CONNECTIONS



CRAWFORD THREE-PASSenger ROADSTER CAR

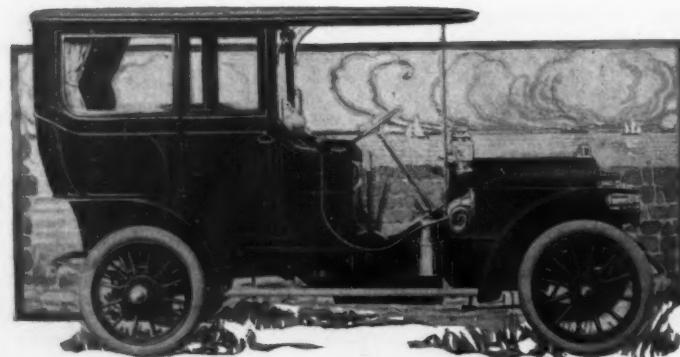
it has been entered that the features of its design have become so well known as to scarcely call for comment.

C. G. V.—The Charron, or C. G. V., as it is more familiarly known, was one of the first French makes to come into this market. At the show these cars will have the distinction of being both the smallest and largest on the floor. The line begins with an 8-10-horsepower model and ends with a 90-120-horsepower chassis. Between these two extremes, the lowest of which represents a two-cylinder town car, there is a range sufficient to meet every demand. For instance, there are 12-15, 15-20, 20-30, 30-40, 50-60 and 75-90-horsepower models, all being equipped with a four-cylinder type of motor. The 12-15-horsepower model is shown complete with body in two types, the remainder being listed as chassis alone.

Benz—The makers of the Benz doubtless lay claim to being the oldest manufacturers of cars extant and were responsible to a great degree for its development in earlier days. It has only been within the past year or so, however, that they have made any attempt to enter this market. The car is made in a variety of four-cylinder models.

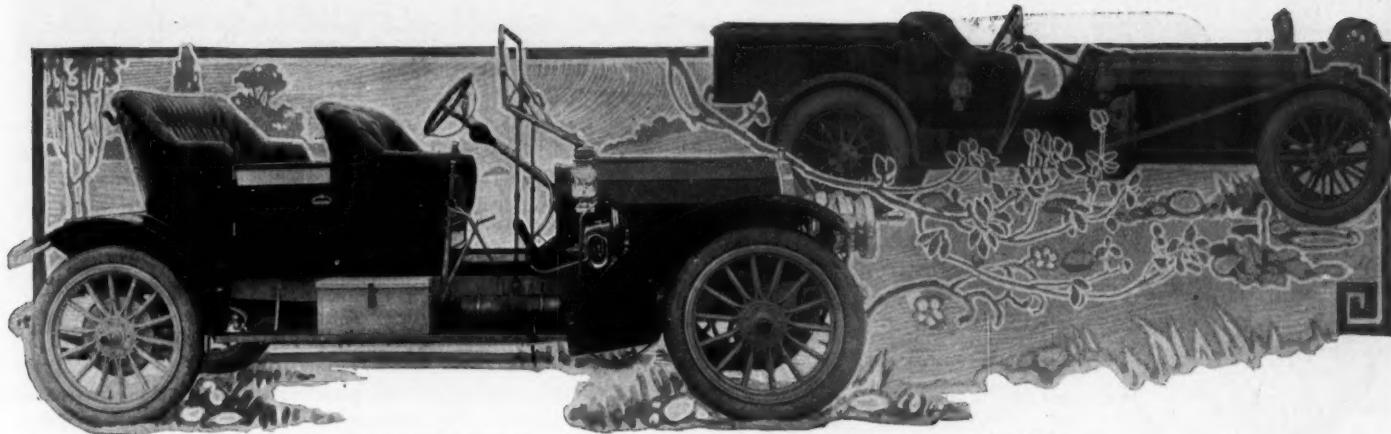
Fiat—The importers of this car will have an ample line to choose from during the 1909 season, the models ranging in power from a four-cylinder 12-horsepower, up to a 60-horsepower model of the same number of cylinders, or a 45-horsepower six-cylinder type. In all there are no fewer than seven models. Next to the smallest car, there is the Fiat 18-horsepower chassis, then a 25-horsepower model and above that one of 40-horsepower. There are two chassis rated at 45-horsepower, a four-cylinder and a six-cylinder. The 12, 18 and 25-horsepower chassis are of the shaft-driven type, as is also the 45-horsepower model, the remaining three having the side chain type of final drive.

Glide—A product of a well-known western factory is the Glide, manufactured by the Bartholomew Co. This firm will show one chassis model for all types of bodies, except that on the touring car the wheelbase is 120 inches instead of 106 inches for the roadster, and the wheels are 34 inches instead of 36. This car is powered by the celebrated Rutenber motor of special Glide design. The cylinders are $4\frac{3}{4}$ by 5 inches, rated at 45 horsepower. A single ignition system is used, although a Bosch magneto is optional. The multiple-disk clutch, which is contained in an oil-tight case in the flywheel, is used to convey the power to the selective gearset located just forward of the differential gear housing. The front axle is of I-beam design and is made from alloy steel with very large yokes. A semi-floating rear axle, in



THE GAETH—TWO FOUR-CYLINDER LIMOUSINE STYLES—THE DE LUXE





WELCH TOY TONNEAU CAR AND ROADSTER WITH HUNTING EQUIPMENT BOX

which the differential pinions are fitted on three large keys, and for which the claim is made that there are no light keys, lock nuts or cotter pins to get loose and cause trouble, is a feature of this car. The claim is made that, with the exception of the motor ignition devices and tires, all parts of the Glide car are manufactured by the Bartholomew company.

De Dion—The name de Dion is associated with the earliest appearance of the foreign made cars in this country, and for the first 2 or 3 years, not a few machines of this make were sold in this country, though they were principally of the voiturette type which has since completely disappeared. During most of the interim they have not been actively represented here. These cars are in one and four-cylinder models, the single-cylinder voiturette being one of the biggest selling cars in Europe and one of the best of its class. It has magneto ignition. The four-cylinder de Dions employ the well-known crankcase-contained lubricating system, and the combined stationary and live rear axle which this concern was a pioneer in making. The gearbox is carried on the frame immediately in front of the axle.

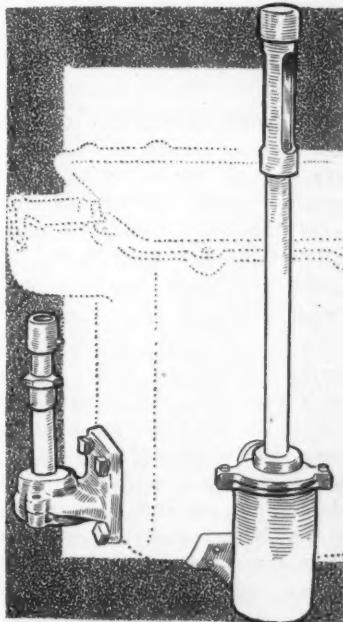
Renault—Few foreign cars have a wider representation in America than the Renault. It is made for 1909 in two, four and six-cylinder models, the four being the leader. The new two-cylinder voiturette previously described in Motor Age has already become one of the popular cars in Paris. The Renault six is fashioned along four-cylinder lines, using thermo-syphon cooling and a progressive type of gearset. The motor uses a transverse front shaft with the magneto on one end and the distributor on the other. The radiator is between the dash and the back cylinder. All Renaults are shaft-driven machines.

Crawford—Another maker seeing the handwriting on the wall and preparing for it by bringing out a low-priced four-cylinder model is the Crawford Automobile Co. This firm shows two models, one model G which is practically the same as last year's, and the new one is styled model H. This car has a four-cylinder water-cooled motor, 4 by 4 inches, and rated at 20 horsepower. Spark is furnished by a magneto, with a battery for starting. The selective gearset and floating rear axle transmit the power to the rear wheels. All brakes are on the rear wheel hubs and are lined with camel's hair. Full-elliptic in the rear and semi-elliptic springs in front help to absorb the road shocks. This

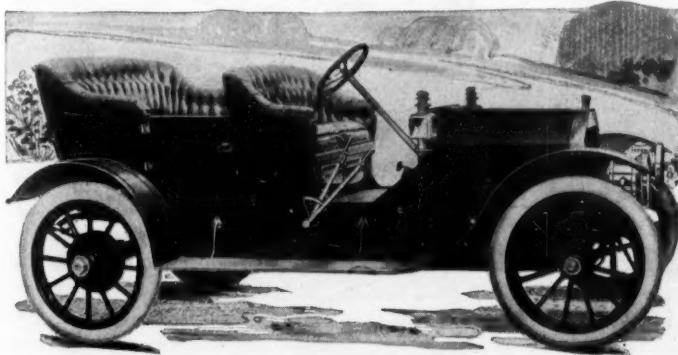
chassis is furnished with either roadster, baby tonneau or touring bodies, all of them good looking creations.

McCue—Another car exhibited for the first time at any national show is the McCue, built by the McCue Co. Two body models on slightly different chassis are shown, the difference being only in the wheelbase. This car is driven by a 30-horsepower four-cylinder motor with double ignition system, Bosch magneto and battery. A selective transmission and a leather-faced cone clutch are used. A special feature of this exhibit is the pressed steel axle housing for the floating type rear axle. This housing is pressed from one piece of steel and the seam at the front end is welded by the autogenous process. The design shows a very graceful taper from either end to center. The differential case is held in position on the driveshaft housing instead of on the axle housing proper and can easily be removed by taking out twelve bolts. Large ball bearings are used at all friction points. Double brake drums of pressed steel are used on each wheel, the brake rods being located inside the frame.

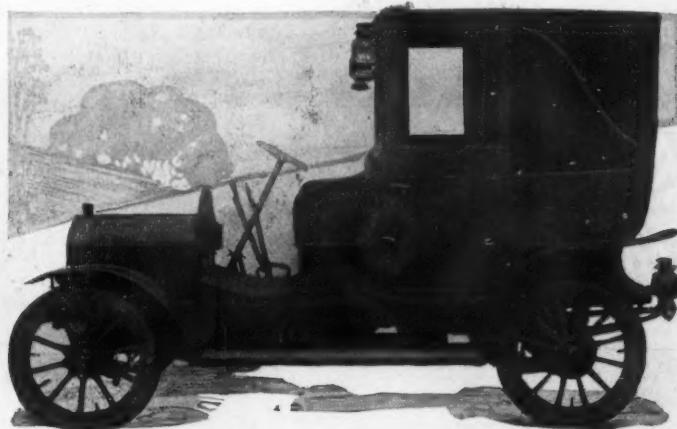
Kiblinger—The W. H. Kiblinger Co. is manufacturing several models of high-wheel motor buggies, surreys and delivery wagons. With the exception of its 27-horsepower car, equipped with a four-cylinder four-cycle vertical type motor, all



PULLMAN OIL PUMP AND GAUGE



THE MCCUE TOY TONNEAU



SULTAN LANDAULET TOWN CAR



ENCLOSED HOLSMAN MOTOR BUGGY

models are equipped with $3\frac{1}{2}$ to 16 horsepower, offset, opposed, air-cooled motors. The valves are in the head, ignition is jump spark and the current supply, dry cells. There is mechanical lubrication and a float feed carbureter. The bearings of the crank-shaft are of parsons white bronze; roller bearings in wheels and bronze bearings in transmission. The clutch is of the multiple disk type.

American Truck—Covering the field completely, with seven regular models, ranging from a 20-horsepower $\frac{1}{2}$ -ton commercial, known as model T, to model O, which is rated at 5 tons, and is equipped with a 65-horsepower motor. Three of the line use a two-speed transmission, and with ample power, in these cases, through the good office of a four-cylinder motor, it is not to be wondered at if the system is regarded as an unqualified success.

Commercial Motor Car Co.—This company will exhibit the Safir & Sauer trucks, of 5-tons maximum carrying capacity. The Safir & Sauer trucks, of 5-ton maximum carrying capacity. The opposite valves. The Sauer trucks employ a similar style of motor and drive through a selective gear-set and side chains. Ball bearings are used in the gearset as well as in the road wheels. The trucks are made in 2 and 4-ton sizes.

Welch—Pioneer is a good word to apply to this product of the Welch Motor Car Co., which produced in 1904 many forms of construction which are today considered correct. Thus this firm was a pioneer in the production of the multiple-disk clutch running in an oil bath, the truss reinforcement for the narrowed frame, the overhead valves and camshaft and the completely finished spherical combustion chamber. The latter, featured by this firm for the past 4 years, is now accepted on the continent as the form for racing cars, and accordingly all continental racers are so equipped. The Welch company has gone one step farther and applied this theoretically and practically perfect

cylinder arrangement to all cars built by them. These will consist of two classes, one four and one six-cylinder, with the usual range of bodies for each.

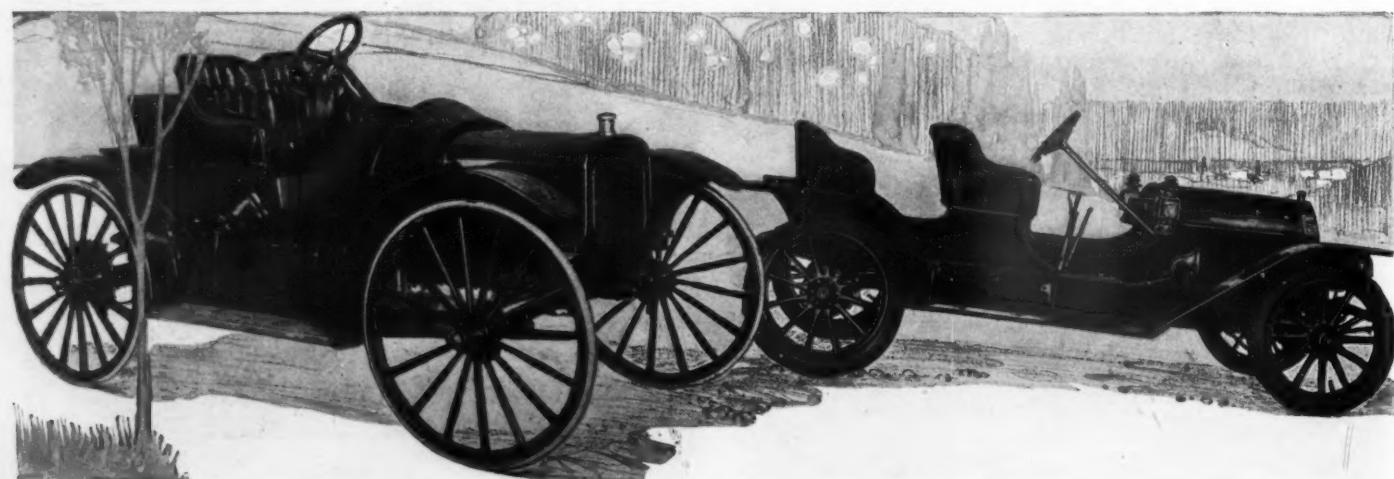
Pittsburg Electric—The principal feature of the type I Pittsburg electric delivery wagon is the direct drive from the motor to the rear axle by means of Morse chains. It carries a twenty-two-cell battery. The type 2 vehicle is capable of a 1,500-pound load and 40 miles on one charge, with individual motors for the rear wheels.

Holsman—What is probably the novelty in power plant construction of the show will be seen in the gentleman's model to be shown by the Holsman Automobile Co. The construction of this power plant is a single unit motor, and transmission, with the driving shaft and housing all in one. The motor might be termed a four-cylinder opposed and its peculiarity lies in the elimination of connecting rods. The pistons for each of the pair of opposed cylinders are very short, something like the steam engine piston, and a web from the crankcase end of each piston joins the two together at a central point where a large hole is bored to receive a roller bearing. This bearing fits on an eccentric on the crank-shaft. The eccentrics for each pair of cylinders are set 180 degrees apart. The crank and drivingshaft are integral.

Grabowsky—The Grabowsky Power Wagon Co., Detroit, is now manufacturing a 1-ton delivery wagon and $1\frac{1}{2}$ and 2-ton trucks with wheelbases of 102, 127 and 127 inches respectively, and a pair of passenger cars, 12 to 16 and 20 to 25 passengers respectively. The power plant is of the interchangeable, self-contained unit type. The motors are of the two-cylinder opposed, and water-cooled, and rated at 25-30, 30-35, with a bore and stroke of $5\frac{1}{2}$ by 5 and $5\frac{1}{2}$ by 5 inches. The crankcase is constructed of gray iron. The crankshaft is a solid one-piece drop forging of chrome nickel steel. The valves are of chrome nickel steel with cast iron heads.

Pittsburg Six—The Fort Pitt Motor Mfg. Co. has three models, a three-passenger disappearing seat roadster, a four-passenger roadster and a seven-passenger touring car. All three have the same chassis except that in the touring car some frame changes are made to accommodate the seven-passenger body. Extra heavy running gear is used. Among the distinctive features of the 1909 models are the Hele-Shaw multiple-disk clutch and a new inlet manifold for a six-cylinder motor, with cylinders cast separately. The cylinders are single castings with integral water-jackets and valve chambers on either side. The bore and stroke are $4\frac{3}{4}$ by $5\frac{1}{4}$ inches. The crankshaft is of the seven-bearing type with plain broad white bronze bearings, and is made of chrome nickel steel. Valves are mechanically operated and interchangeable, with electrically-welded heads. Lubrication is by splash feed. Jump spark ignition with magneto and storage battery is used for current supply.

Browniekar—The Omar Motor Co. manufactures the Browniekar, a rig for boys. It is a belt-driven, wire-wheeled machine, with a 3.6 horsepower motor.



THREE-PASSENGER KIBLINGER CAR

INTERSTATE THREE-PASSENGER RUNABOUT

Commercial Department

THE motor car industry has been called the most progressive industry in the world, but surely if this is to be taken literally it must have an addition so that it will read, "excepting only the commercial vehicle industry." If the latter could be separated from the former, it would easily be accorded the premier position. The little work that has been done in the past is, as one might say, only a drop in the bucket to what is being done today while the latter in turn occupies the same position toward the future of the commercial rig.

Today any sub-division of this industry into clearly-defined branches may be made, many of these being possible. These sub-divisions in turn may be selected at random, and any one of them will show a most unusual progress. This progress has taken on various forms, to specify any one of which would be to delve into the minor details, which is not the purpose here. However, to generalize and at the same time be specific, the subject of motors may be mentioned. The progress in this line may be summed up in the statement that the light and possibly complicated engine of the pleasure car has been divorced from the commercial vehicle. The tendency toward simplification everywhere manifest is here shown in the elimination of the ultra-light-weight metals of high first cost in favor of better known and more stable materials of a low price per pound; in a word, the substitution of cast iron for aluminum.

In addition, there is the relative increase in stroke with a corresponding decrease in speed, which may be summed up as the substitution of the long-stroke slow-speed motor of long life for the "short" high-speed engine of comparatively brief existence. This example brings out a point which stands out clearly in the whole list of commercial improvements, and that is, the decrease in repairs or maintenance, due to the additional skill in designing and superior choice of materials. This is a most encouraging sign for prospective buyers of these rigs.

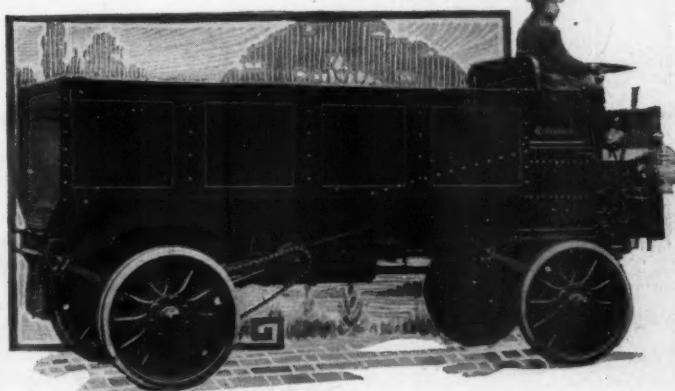
This being an item which either encourages or discourages the new convert to the power wagon it is of vast importance and far-reaching in its results. Therefore, it is well worthy of careful attention. A specific instance of this under another sub-division is the matter of tires. This has been given most careful attention, both by the tire and the car manufacturers, and well it might, for of all the items which have demanded attention in the past, that of tires has up to very recently received the least. This lack of attention has manifested itself in the use of the tire which cost the least regardless of the prospective service. It has cropped out in such shapes as the use of 1½-ton tires on 3-ton trucks. Naturally this spelled quick tire depreciation, each hardly-won convert soon slipped back to horses, and the truck became known as a "tire eater." It is pleasing to note in this connection the increased attention now being given to this subject by both sides.

The first wheels were merely larger pleasure car wheels with no visible difference. Today we find the two as different as black and white. The truck wheels are now very properly built for truck use with heavier, more rugged and long-lived parts correctly proportioned to the work, and account taken of the inevitable and ill-advised overload. The weakest portion of the wood wheel is the junction of the spoke and the felloe, or rather at the reduced

diameter of the spoke where it enters the felloe. A recent movement among the English heavy vehicle manufacturers has as its object the elimination of this weak point. This is accomplished by the gradual widening out of the spoke from hub to felloe and the change from a round to a square end with a vastly increased area at the breaking point. In this connection, all steel wheels are receiving much attention for lighter work, and those in use have given satisfaction.

The matter of noise is one that is becoming of larger importance every day, as users of good vehicles find that noise is separable from the proper operation of cars; in other words, as they find out that it is possible to have a noiseless vehicle operate as well as a noisy one. This was for a long time considered as an exclusive feature of the electric, but that idea is losing ground daily. The change has been brought about by the successful use of chain cases, silent chains, and of the worm gear drive. A similar desired result has been the reason for the use of the planetary transmission on small cars and of the individual clutch type on larger cars.

Reliance—The Reliance motor trucks, with the exception of two minor improvements, are practically unchanged. The motors are comprised of two, three and four cylinders, and two-cycle, with 5½ by 5-inch bore and stroke, and rated at 30, 45 and 60 horsepower respectively. The crankshafts are of high carbon steel, hammer-forged and heat-treated. Bearings are of a special babbitt, sufficiently long and adjustable from outside of crankcase. Lubrication is by means of a force feed oiler with separate adjustment for each feed. The transmission is a three-point suspension, three speeds forward and reverse. Hess-Bright ball bearings are used throughout, with the exception of the differential gear, which is of special design and supported on two Timken roller bearings. The outer ends of the jackshafts are supported on Hyatt roller bearings 8 inches long. The transmission case is in one piece and not split through the center. The regular service brakes are applied to drums attached directly to the front sprockets on the jackshafts. The emergency brakes, operated by hand lever at the right of the driver's seat, are applied to drums attached to the rear wheels. Both sets of brakes disengage the clutch. Cooling water is circulated by a positive gear-driven pump or by thermo-syphon system. The radiator is of the honeycomb type and is supported in a case made of channel



ONE OF THE NEW FLEET OF RAPIDS



TYPE 2 OF THE PITTSBURG ELECTRIC

steel $\frac{1}{8}$ -inch thick. Rubber cushions are applied between steel casings and the radiator, and no studs or bolts, or connections of any kind, except the inlet and outlet water hose, are attached to the radiator. The ignition is by jump spark. Current is applied by two storage batteries or by high or low-tension magnetos. The wheelbases of the several models range from 108 to 136 inches. The drive is by side chain from jackshafts to rear wheels. The clutch is aluminum, leather-faced cone, with cork inserts. The front wheel axles are of heavy I-beam with 2 to $2\frac{1}{2}$ -inch spindles, equipped with Timken roller bearings. The rear axles are of solid 3-inch forged steel, with 2 to $2\frac{1}{2}$ -inch spindles, also equipped with Timken roller bearings.

Rapid—The Rapid Motor Vehicle Co. is now marketing a new 5-ton truck. The frame is of a heavy channel steel, with a substantial subframe. The motor, rated at 60 horsepower, has cylinders cast in pairs, with integral heads, valve chambers and waterjackets. Intake and exhaust valves are located on the left side, as are the magneto, carburetor, water pump and oiler. Valve heads are electrically welded to stems of large diameter. The crankshaft is of hammer-forged nickel steel and supported in the upper half of the crankcase by three broad phosphor bronze bearing caps. The ignition is by jump spark, current supplied by storage battery, or high-tension magneto. Lubrication is by a force feed oiler. The clutch is of the multiple-disk type and enclosed in the flywheel. The transmission is of the sliding gear selective type, three speeds forward and one reverse. The bevel gear and pinion are housed in the transmission case. Timken roller bearings are used throughout. Drive is from the jackshaft by side chains to rear wheels. Control is by spark and throttle levers on the steering column. Change speed and

emergency brake levers are to the right of the driver's seat. The regular surface brakes are applied to drums on the jackshaft and are of the contracting band type, lined with a non-combustible material. The emergency brakes are of the internal expanding band type and are applied to drums on rear wheels. The pull rods are provided with equalizers to insure an even distribution of pressure on the brakes. The front axle is of heavy I-beam section, with spindles equipped with Timken roller bearings. The rear axles are of round section and also equipped with roller bearings. The front springs are semi-elliptic, the rear full platform.

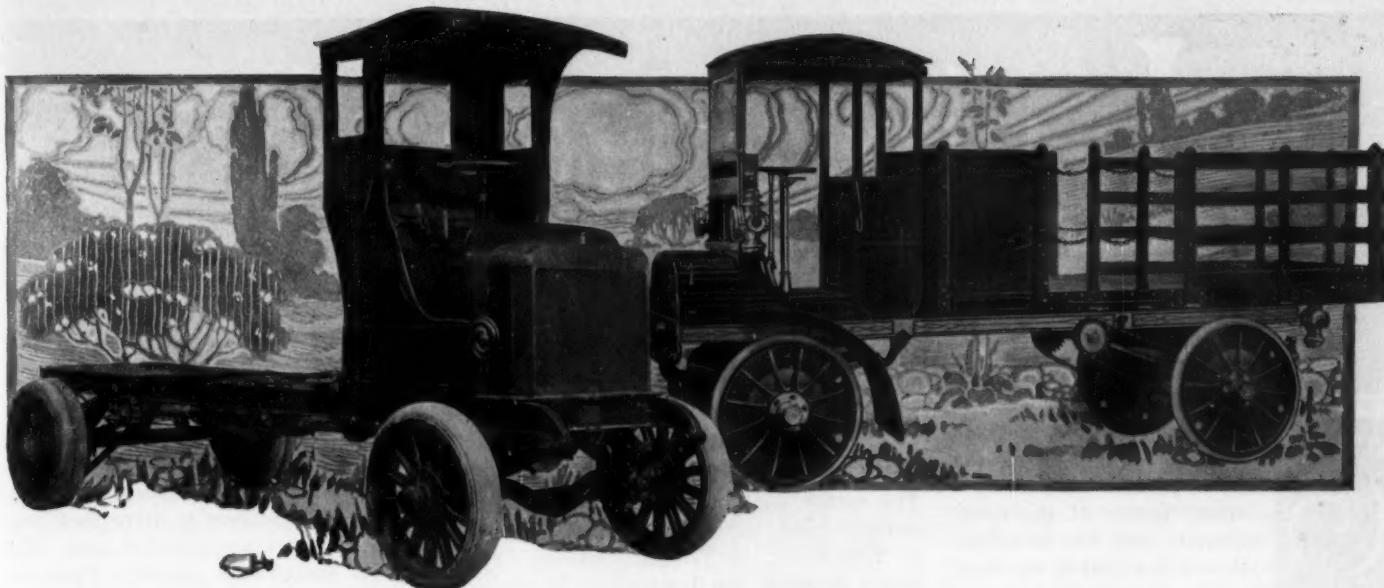
Rockwell—One of the newcomers in the commercial field is the Bristol Engineering Corporation, of Bristol, Conn. This concern, which is known in other lines, has now brought out a taxicab, not merely a side step from pleasure car production, but a new and original design with many commendable features. The list of parts would show only a standard car of small dimensions with a four-cylinder motor under the hood, selective three-speed transmission and shaft drive, but to delve below the surface would be to find that the parts are standard in name only, the details showing a remarkable quality of up-to-dateness. But one model is produced with 3% by $4\frac{1}{2}$ motor, rated at 20 horsepower, equipped with landauet body and furnished with any make of taximeter.

Gaeth—Ever since Paul Gaeth has been devoting his attention to the manufacture of motor cars, both before and since the formation of the Gaeth Automobile Co., of Cleveland, he has given a great deal of time to perfecting a single-cylinder type of car for commercial purposes, this now being listed as Gaeth type K, for the coming season. Its power plant consists of a single-cylinder horizontal motor rated at 12-15 horsepower, while the change-speed gear is of the planetary type, giving two speeds forward, the power reaching the rear wheels through double side chains, thus making the car as a whole as simple as it is possible to design it, so that it can be depended upon to render constant and efficient service in the hands of the most inexperienced driver. The Gaeth type K delivery wagon has a load capacity of 2,000 pounds and is very economical to run and maintain.

Brush—This maker will concentrate his energy and factory capacity upon one type and model of light delivery wagon possessing many original features. Beginning with left-hand control, coil springs, wood axles, single-cylinder vertical motors, etc., right through the car, this originality crops out and makes this what the maker desired it to be, a decidedly different vehicle. No doubt, when the buying public has been educated to see the advantages of these "decidedly different" features, we may expect that they will sell in very large numbers, as Brush has selected the largest field of all, the small dealer or trader who handles very light weights. This little car weighs but 950 pounds and is built to carry 500 pounds normally and 300 pounds



HART-KRAFT DELIVERY WAGON AND THE LITTLE BRUSH



TWO OF THE TRUCK FAMILY, RAPID AND GRABOWSKY

overload, making a maximum weight, when fully loaded, of 1,750 pounds. The single-cylinder 7-horsepower motor will then never have over 250 pounds per horsepower, so that the power provided is ample. In addition, these cars are geared down very low, so low, in fact, that a speed in excess of 14-15 miles per hour is impossible.

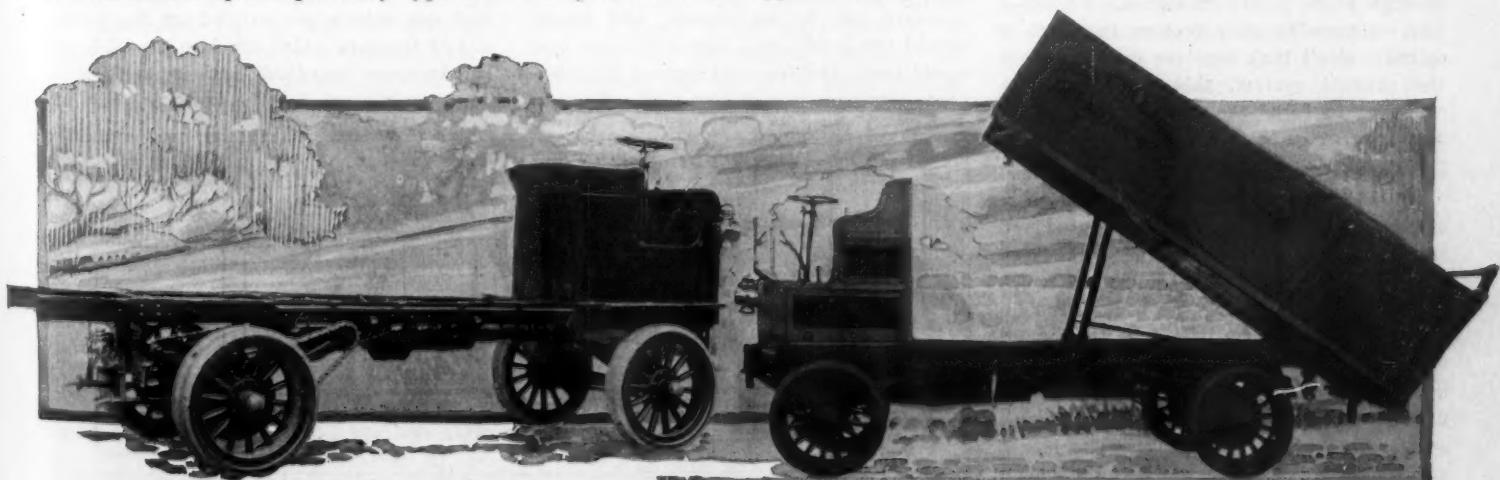
Gramm-Logan—Three commercial vehicle types are built by this concern. The largest is a 3-ton truck with four-cylinder water-cooled motors, $4\frac{1}{2}$ by 5-inch cylinders, rated at 40 horsepower. It has magneto and battery ignition and crankcase contained oiler. The gearset gives three forward variations. Final drive is by side chain. The second model is $1\frac{1}{2}$ -ton truck fitted with a 25-horsepower air-cooled motor with 4 by 4-inch cylinders. The third model is an air-cooled delivery wagon, with the same motor as in the $1\frac{1}{2}$ -ton truck. It has a carrying capacity of 1,600 pounds.

Hart-Kraft—The Hart-Kraft Motor Co. is now marketing a motor delivery wagon with a power plant which is an interchangeable, self-contained unit. The entire mechanism, motor, magneto, transmission, clutch, differential, jackshaft, intakes, carburetor, exhausts, low speed and reverse pedals and direct drive lever are all self-contained and suspended from the body from at three points by five bolts. The motor is of the double-opposed type, with offset cylinders, $4\frac{1}{2}$ by 4-inch bore and stroke. Water cooling is effected by the thermo-syphon system and air-cooling by the large fan blades which constitute the spokes of the flywheel. A Schebler carburetor is fitted. The motor lubrication is effected by means of a sight feed oiler. The transmission is of a special planetary type with two speeds forward

and one reverse. The clutch is of the multiple-disk type and both clutch and transmission are immersed in an oil bath. The jackshaft bearings are of the Hyatt roller type. The differential is of the Brown-Lipe bevel and pinion type, encased in a crucible steel case. Wheel bearings are of a standard annular roller type. The drive is of the double side chain type. The front axle is drop steel forged, $1\frac{1}{2}$ inches in diameter.

Coates-Goshen—With two chassis and four models, the Coates-Goshen Automobile Co. has entered the show prepared to hold its own in view of the modern work put upon the cars this company has to offer to its patrons. The model 25 has a four-cylinder motor, 4 by 4-inch bore and stroke respectively. It is water-cooled, has a cellular radiator, and the ignition includes a Bosch magneto. The selective transmission has three speeds forward and reverse, and the wheelbase is 112 inches, with a $56\frac{1}{2}$ -inch tread. On model 32 the bore and stroke respectively of the motor are $4\frac{1}{2}$ by 5 inches, and in general all the features to be found on the model 25 are included. The transmission is with three speeds, as well as reverse, with a wheelbase of 116 inches and $56\frac{1}{2}$ -inch tread.

Manhattan—This company manufactures a complete line of motor trucks and sight-seeing wagons, all of which are equipped with the same four-cylinder four-cycle $5\frac{1}{2}$ by 6-inch motors with twin cylinders. A double system of ignition is fitted. The transmission is of the individual clutch type, giving direct drive on the third speed, and with shaft carried on Hess-Bright bearings. The full line includes 2, 3, 4 and 5-ton trucks. Buses and sight-seeing cars with passenger capacity from 12 to 22 and various types of trucks.



AMERICAN AND MANHATTAN TRUCKS BUILT FOR HEAVY SERVICE



GHERE are four great methods employed in lubricating the motors of 1909 cars, which a cursory glance at the many machines that will be on exhibition will reveal. By these four methods is meant complete systems for oiling the crankshaft bearings, the upper and lower connecting rod bearings, the cylinder walls, the camshafts, and other minor parts. In addition to these four big systems are almost 100 individual schemes for better lubrication of the lower connecting rod bearings, or the wrist pins, and the prevention of leaking from end bearings in the crankcase, gearbox, and rear axle.

The four main systems are: First—The mechanical oiler carried either on the crankcase, on the dash, or under the foot-board, driven by gear, wire belt, leather belt, chain, pawl and ratchet, or eccentric, and with its number of feeds varying from two in some of the motor buggies to fourteen in the six-cylinder type. Second—The crankcase-contained system in which the lower half of the crankcase is made up of two compartments—an upper one and a lower one, the latter being an oil well in which is located an oil pump that elevates oil to the crankcase proper, the crankshaft bearings and cylinders. Third—The flywheel oiling system used in the Ford and Jackson model E, in which the oil reservoir is a casing for the flywheel, and the rotation of the flywheel throws the oil upwards. Falling in pockets, it is conducted through pipes to the crankcase. Fourth—The compression oiler system, in which a cylindrical oil tank receives pressure from the exhaust system, this pressure being sufficient to force the oil with the assistance of gravity to the several motor parts.

Detached Mechanical Oiler

Of these four systems, the detached mechanical oiler has the largest following, but is closely pursued by the crankcase-contained system, which has gained enormously in favor during the last year, and if this gain continues it will be the leader for 1910. The compression oiler system has but a very limited following and finds use generally on two-cylinder cars and some makes of motor buggies. The lubrication novelty of the season is the flywheel system, as used on the Ford and Jackson.

By David Beecroft

This system is the simplest of the lot, not calling for any additional mechanical parts in the motor, but simply utilizing the rotary action of the flywheel. It has only two followers, but may be looked to as a more important factor 12 months hence. Its use necessitates the thorough incasing of the flywheel, and making this case an oil well. The four-cylinder Ford it is used on has the cylinders formed in one casting, whereas the model E Jackson uses separately cast cylinders.

Varied Mechanical Oiler Systems

Although such firms as Welch, Chadwick, American, Jackson, Moon, deLuxe, Pennsylvania, Gaeth, Moline, Atlas, Premier, Kissel, National, Mitchell, Acme, Cartercar, Reo, Reliable-Dayton, and others use the mechanical oiler, the details of their systems vary considerably. Practically all agree, with the exception of two or three at the utmost, to carry the oiler under the bonnet, instead of on the dash, these makers realizing that where located on the dash the oil is at the mercy of the temperature—hot in summer, cold in winter—whereas, beneath the hood it is much better protected from the whims of the weather man, and a more uniform feed is secured without adjustment. Those placing them under the bonnet are far from being content with one location; the Premier has it positioned snugly beneath the exhaust manifold where a uniform temperature can be maintained, and where, should the motor heat, this additional heat would have its effect on thinning the lubricant, resulting in a faster feed. The ma-

jority of others place it on the left or right rear motor arms, reserving the forward motor arms for magneto and water pump.

The question of how to drive these mechanical oilers is an unsettled one: The American employs an eccentric drive, on two of the Jackson models it is gear driven, the Kissel car employs a belt, and one maker continues the use of a chain which has been discarded by a great many because of the noise element and the danger of its jumping sprocket teeth.

In the Chadwick system thirteen of the fourteen feeds go to the engine—four to the crankshaft bearings, six to the cylinders, and three to the crankcase compartments. In conjunction with this system the Chadwick crankshaft is made hollow so that the oil fed to the bearings reaches the lower connecting rod bearings as well through centrifugal force. The Pennsylvania is on a par with the Chadwick in the drilling of the crankshaft for the lower connecting rod bearings, and feeds oil direct to its motor parts. The Marmon cars are leaders in motor lubrication and in the drilling of the crankshaft and connecting rods. Few of the other makers drill the crankshaft, all of them depending on the overflow from the crankshaft bearings to supply the splash into which the lower connecting rod ends dip. To make sure that the lower connecting rod bearings are properly lubricated, the deLuxe car has a portion of the lower cap cut away at each side, thus affording free access of the splash into the bearing. On the Speedwell car scoops are carried on the lower end of the caps which dip into the oil level and increase the splash further than would be accomplished by the ordinary dip of

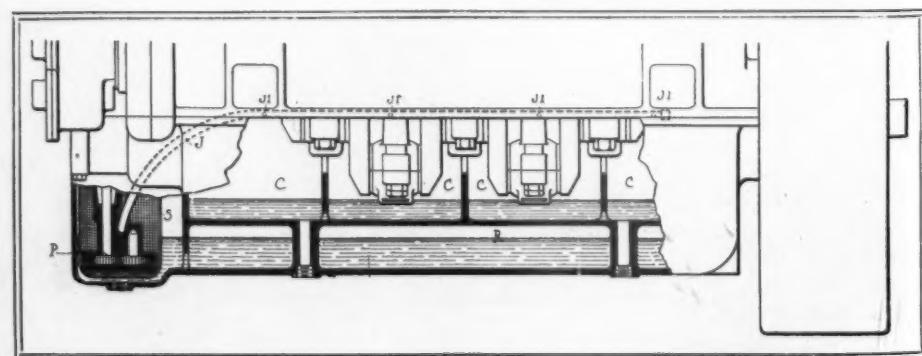


FIG. 1—CRANKCASE CONTAINING OILING SYSTEM IN RUTENBER MOTOR

the cap. On the American the connecting rod cap is made extra long in order to accomplish the same result. In order to more completely lubricate the lower connecting rod bearings, the deLuxe makers attach grooved disks to the crankshaft adjacent to the D. W. F. bearings for it. Each disk collects the oil and has an extension which feeds by centrifugal force into the bored crankpin and thence to the lower connecting rod bushing. All of the representatives of the mechanical oiler use transverse partitions in the crankcase, some of them using one, dividing it into forward and aft halves, one compartment for the two front cylinders, the other for the two rear. Several of the makers have gone further and use three partitions, thereby obtaining four compartments—one for each connecting rod. This construction appears in the American, in which the central partition is the highest, and the other two, between the first and second and third and fourth cylinders, being but little higher than the oil level. Other exponents of the four-compartment oil plan are Gaeth, Moline, Regal, Jackson model E, and doubtless a few others that have not come under the immediate observation of the writer.

Carries Reserve Supply

The American car has fitted in connection with its mechanical oiler carried on the dash, a reserve oil tank of cylindrical type, located beneath the chassis frame at one side, and from which the oil can be fed as desired to the reservoir of the lubricator. This oiler is of 1½-gallon capacity and its presence eliminates the necessity of having to get half gallon cans with which to fill the lubricator.

A few of the exponents of the crankcase-contained oiling system are: Stoddard-Dayton, Austin, Pullman, Regal, Lambert, Glide, Speedwell, Benner, Sharp-Arrow, Inter-State, Crawford and manufacturers using the Rutenber and Continental motors. This crankcase-contained system deserves to be called the de Dion, in view of the fact that it was exploited first by this concern, and since then has been gradually on the increase. The primary characteristic of this system is the oil reservoir R beneath the crankcase, Fig. 1, together with an oil pump P of one nature or another, either to force the oil direct to the cylinders and bearings, or to an oil tank carried higher up than the cylinders and from which the oil feeds by gravity. The fourteen or more exponents of this system, while employing the same principle, accomplished it in divers manners: Some use a plunger pump driven from the crankshaft to elevate the oil, others use a gear pump, as in this illustration, and then there are some who employ a centrifugal pump. The diversity goes further. One maker places the pump within the oil reservoir, another at the right side of it, another at the left side, another to the front, and another to the rear. In spite of this diversity, all agree in driving these pumps from either the intake

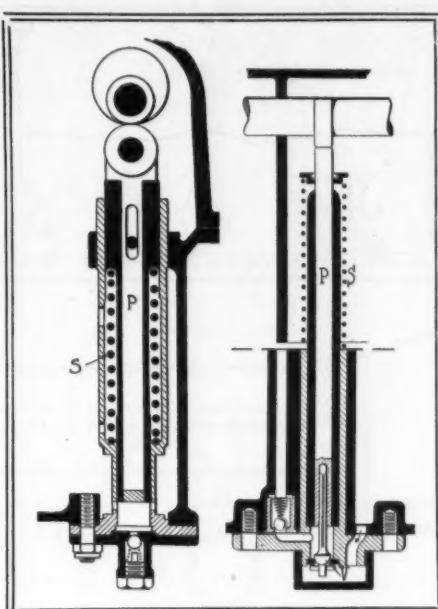


FIG. 2—STODDARD OIL PUMP AT LEFT
FIG. 5—INTER-STATE OIL PUMP AT RIGHT

or exhaust camshafts, doing this by double or spiral gears, excepting the Stoddard-Dayton and Inter-State, which employ plunger pumps, which drive by eccentrics or cams on the camshaft. In all the aim is to oil the motor. One make has the pump P just elevate oil from the reservoir R to the crankcase proper compartments C; another feeds it through a pipe J along the crankcase to the branches J1 to the four cylinders, or if not to them, then to the crankshaft bearings instead. Once used the oil filters back through the screen S around the pump and is once more ready to be circulated.

The Stoddard Idea

In the Stoddard system the single plunger pump has a $\frac{1}{8}$ -inch piston or plunger with $\frac{3}{4}$ -inch stroke, carrying a roller on its upper end for contacting with a cam on the camshaft, Fig. 2. On the upstroke of the plunger, which is accomplished by a coil S spring, oil is drawn from the crankcase oil well into the plunger, and on the downstroke, accomplished by the cam this oil is forced through a pipe 9 inches long outside of the crankcase to a distributing manifold carried beneath the top of the upper half of the crankcase. This distributing manifold has six graduated leads, three going to the crankshaft bearings, two to the camshaft, one to the timer shaft and a seventh lead to the sightfeed on the dash. The crankshaft is drilled and each throw, Fig. 4, carries a grooved disk D, which is filled by the overflow from the main bearings. This disk has an extension E to the axis of the crankpin, whence the oil flows through the drilled crankpin to the lower connecting rod bushings. Attaching the oil disks to the crankshaft eliminates the necessity of having to drill any part of the crankshaft except the crankpin. The force and capacity of the oil pump is such that oil

flows through all of the leads in a stream. From the lower connecting rod bearings a copper tube leads up the side of the connecting rod to the wristpin bearing, which is lubricated by centrifugal action. The overflow oil is returned to the oil well, is filtered, and ready to be distributed again throughout the motor. The only exterior piping in this system is a 9-inch lead from the oil pump to the top of the crankcase and another lead to the sight feed on the dash of the car.

Interstate System

The Inter-State car, one of the new faces to be seen at the show, employs a system similar to the Stoddard, in that it uses a plunger pump, Fig. 5, which elevates the oil to the crankcase proper, where a predetermined level is maintained and all in excess of the requirements of this draining back through overflow holes into the oil well. A novelty in this system is that instead of a large compartment for each connecting rod cap to dip into, there is an exceedingly small one, so that a much less quantity of oil is required to maintain the splash system than where a great amount is carried in the compartment. The oil well has a 1-gallon capacity. A peculiarity of the plunger pump used is that the check valve V, preventing oil returning to the oil well on the down stroke of the motor, is carried from the plunger, and operated by it. Friction between the valve stem and the pump plunger P lifts the valve and it closes on the first 1-32 inch of the down stroke. The spring S lifts the plunger, which has $\frac{3}{8}$ -inch stroke and $\frac{1}{2}$ -inch diameter.

The system employed on all of the Continental motors, Fig. 6, consists of an oil reservoir R beneath the lower half of the crankcase C, with a gear pump P located outside of this compartment and driven by vertical shaft from the camshaft. This pump elevates the oil to a horizontal tube J within the crankcase, which has three distributing branches J1 to the crankshaft bearings. From these the oil overflows into the crankcase and when a predetermined level is reached overflows into the oil reservoir R. The predetermined level is settled in the factory and in conjunction with it are partitions making separate compartments for each connecting

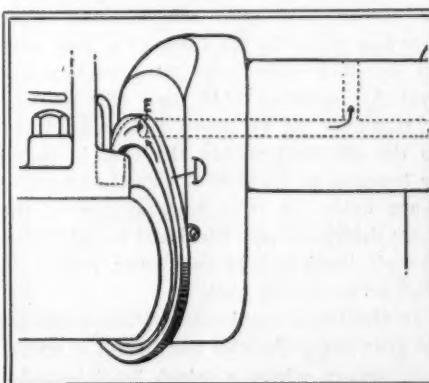


FIG. 4—STODDARD CRANKPIN OILING

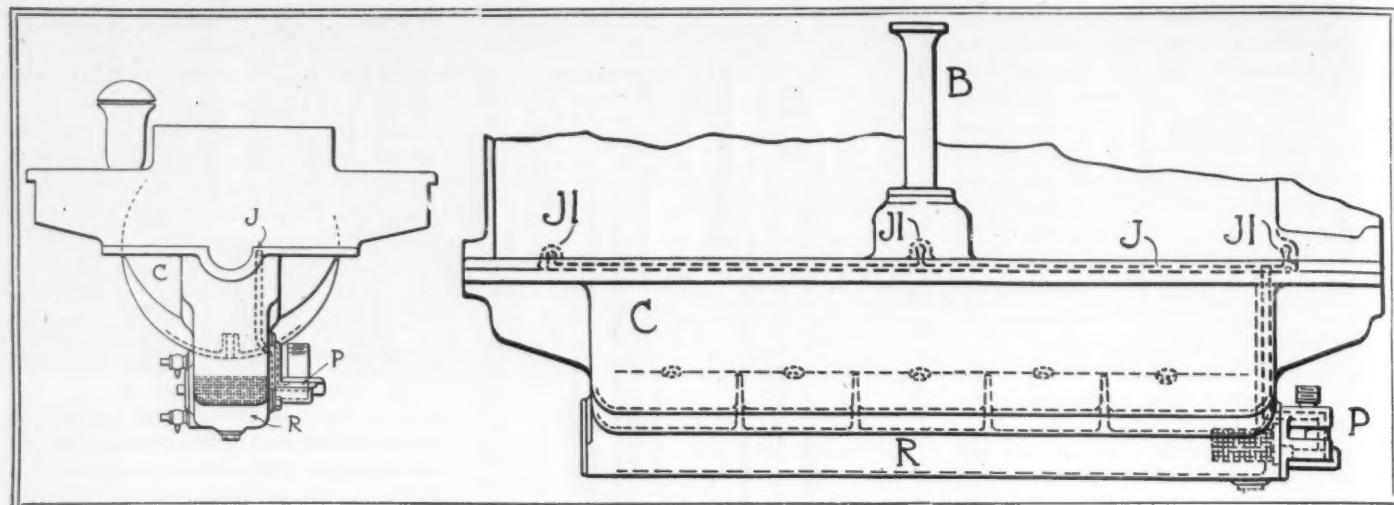


FIG. 6—END AND SIDE SECTION OF OILER SYSTEM IN CONTINENTAL MOTORS

rod. In filling this oiling system through a breather pipe B at the side of the motor, the oil first enters the crankcase proper, whence it overflows into the oil reservoir. This precaution always insures against starting with a dry crankcase.

The oiler design in the Rutenber motor Figs. 1 and 7, is similar in principle and the gear oil pump P is located at the right front of the motor, being carried on the end of the vertical shaft, gear-driven off the crankshaft, and which shaft extended upwards carries the timer T on its top and drives the magneto M midway of its height.

The oiler elevates oil to a horizontal tube J, Fig. 1, on a level with the crankshaft bearings, from which oil feeds into the cylinder walls instead of to the crankshaft bearings as in the case of the Continental. This is the difference in these two systems. This motor has provision made for draining the oil from the two crankcase compartments and a third drain for removing it from the oil well. The regular circulation and recirculation of the oil is maintained, it having to pass through a screening at the pump end in its circulator.

Clever Pullman Idea

The Pullman cars employ a unique adaptation of the crankcase-contained system. The external gear oil pump simply elevates oil into the crankcase proper, which is divided into front and rear compartments. In the side of each compartment is an overflow valve in the form of a disk with an overflow hole near its periphery, so that by rotating this disk the position of this hole can be raised and lowered and so the oil level within the case is raised or lowered as desired. The adjustment of these valves is from the exterior of the case; drip cocks are furnished to determine the oil level in the crankcase proper as well as in the oil well.

In the Regal crankcase-contained system the gear pump elevates the oil to the crankcase proper, where a splash level is maintained, and from which the various motor

parts are looked after. This company uses three partitions in its crankcase.

A particularly elaborate crankcase system is worked out in the Benner car, Fig. 8, in which the external oil pump P elevates the oil to a main channel core J in the top half of the crankcase and running the entire length of it on the exhaust side. In the end of this channel is a drain cock, which can be used to see if the oil is flowing. Should the channel become clogged this can be removed and a wire inserted to remove any obstructions. From this main channel short oil pipes J1 lead to each of the crankshaft bearings, where the oil is fed to pockets above the bearings, whence it leads to the bearing. A novel adjunct to this system is that leading vertically from the main oil channel up to each cylinder wall is an oil lead fitted with an adjustment, J2, by which the oil flow to each crankshaft bearing is regulated and which also serves as a sight test for the oil flow. In conjunction with this system, the crankshaft is drilled from the main bearings to the lower connecting rods.

The crankcase is divided into four compartments by cross webs where the oil collects, and is screened before returning to the oil well.

Pump Elevates Oil

In the Sharp-Arrow crankcase-contained system the pump elevates the oil to each crankcase compartment, whence the splash fills pockets over each of the crankshaft bearings, which furnishes the supply. The Austin cars are fitted with one of the crankcase-contained systems from which the oil is fed direct to the seven bearings of the shaft and from these by drilling the crankshaft to the lower connecting rods.

The Flywheel System

As already stated, the honor of the most unique as well as simple system rests with the Ford and model E Jackson. In the Ford the oil reservoir R is the lower part of the flywheel casing, and the flywheel revolving splashes the oil against the side of the casing where it is collected and fed by special pipes, one running forward to the crankcase and the other rearward to the planetary gearset. The angle of decline of the pipes is such that on extreme grades there is sufficient drop to insure a flow of the oil. In order, as it were, to limit the amount of oil carried in the crankcase, the case is made very shallow, and a depression D, Fig. 9, formed in it beneath each connecting rod into which the connecting rod cap dips and which a small amount of oil is required to fill. These chambers, or depressions, prevent an uneven level of oil within the case. Between the crankcase and the flywheel casing, or oil reservoir, is a baffle plate, or partition with an overflow arrangement, by which a constant level is maintained within the crankcase.

How Jackson Works It

In the Jackson car, owing to the use of individually cast cylinders, Fig. 10, and a separate crankcase compartment beneath each, the system is slightly different from the Ford. In this car the flywheel housing R forms a part of the unit power plant

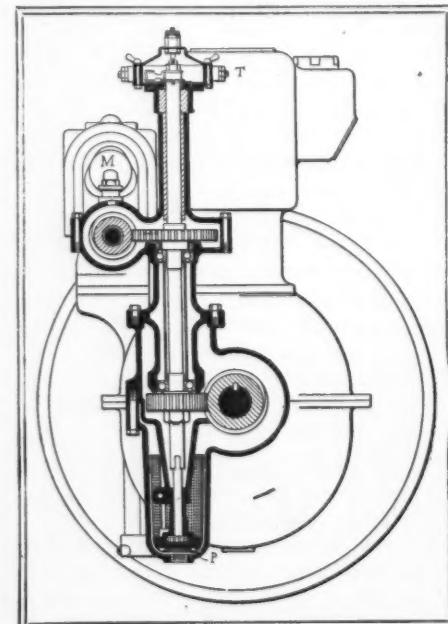


FIG. 7—RUTENBER OIL SYSTEM

and the oil reservoir empties into it. The flywheel rotation raises the oil and fills pockets in the top of the flywheel case, from which pockets the oil flows to the crankcase compartment beneath the rear cylinder. The rotation of the crank throw in this compartment splashes the oil which fills an incline groove or shelf on the side of the crankcase and by which groove the oil is carried to the next forward crankcase compartment. In this way the oil is conveyed step by step to the forward crankcase compartment. A series of standpipes from the oil reservoir provide for a constant oil level in the different compartments. This motor has small pockets D beneath each connecting rod.

Exhaust Pressure Systems

The simplest form of the exhaust pressure system is the cylindrical oil tank carried on the front face of the dash beneath the bonnet, or above the crankcase in a horizontal motor. This oiler is without machinery, pumps or driving members of any nature. The oil would flow from it at a certain rate by gravity, but a lead from the exhaust enters the top and exhaust pressure is used to maintain a positive flow through oil pipes to the cylinders, bearings and other parts.

For Wristpins and Pistons

Devious schemes are employed for oiling the pistons. To do this, very few of the makers employ a piston ring at the bottom of the piston, practically all preferring to cut a series of oil grooves on the lower end of the piston, which fill with oil from the splash when the lower end of the piston leaves the cylinder at the bottom of the stroke. These oil grooves are not used on the Moline or Gaeth cars. In order to lubricate the wristpin, or piston pin, generally two methods are employed, depending on whether the wristpin is anchored in the connecting rod, or in the piston bases. Where it is rigid with the connecting rod and has its bearings in the bosses of the piston, a common practice is to cut a groove, or recess, around the piston at this point, so that the oil collecting in this groove will reach

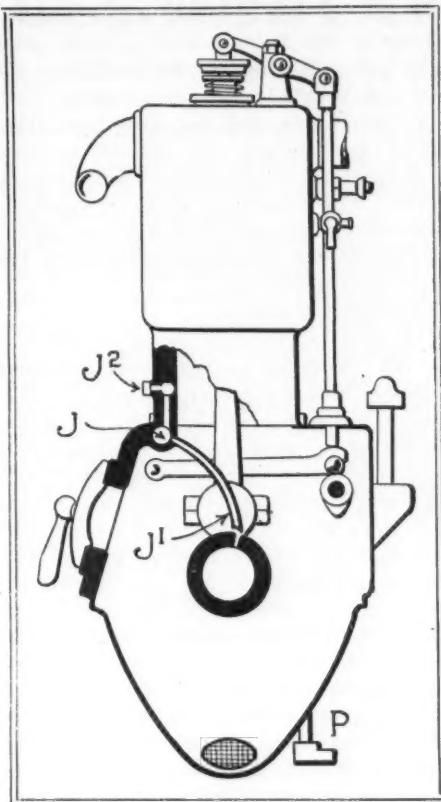


FIG. 8—BENNER OIL SYSTEM

the bearings. Where the wristpin is anchored in the piston and the oil must be carried to a bearing at its center, the hollow wristpin is popular in conjunction with a broad groove around the piston at the ends of the pin. The hollow pin allows the oil to flow from the cylinder walls to the top of the connecting rod, where the pin is drilled to admit it to the bearings. Several makers, however, use the solid pin and get the oil to the bearing from the splash inside of the piston. This is generally accomplished by a pocket on the top of the connecting rod, which is filled from the splash, and from which pocket the oil leads into the bearing.

There are exceptions to every rule, however. The wristpins in the Oakland are

oiled by a tube J, Fig. 13, supported on the connecting rod and which, at its lower end, dips into the splash in the crankcase. In the Regal the wristpin is anchored in the connecting rod, having its bearings in the piston bosses, and the lubrication is by pockets in the bosses which are filled from the splash. The company claims that repeated tests have shown that these pockets are always partially filled with oil. The methods pursued by the Marmon and Stoddard cars for lubricating the wristpins have already been alluded to. In both of these the wristpin is anchored in the piston bosses and the oil is positively fed from the lubricators to the wristpin bearing by way of the drilled crankshaft and thence upward through tubes in the connecting rods to the wristpin.

There are few exponents of the cylinder baffle-plate, that is a horizontal plate filling the lower end of the cylinder and having a slot in which the connecting rod works. These baffle-plates are for the prevention of too much oil reaching the cylinder walls and being taken past the piston rings and carbonizing the combustion chamber.

It would appear that many makers aim at accomplishing or limiting the oil flow by reducing the level within the crankcase and others by entirely eliminating the splash system and feeding direct to all bearing parts.

To Prevent Leakage

The supplying of the proper quota of oil to all motor bearings and the cylinder walls is one problem, and to prevent the leakage of this oil past the end bearings of the crankshaft and camshaft is another which is being ably wrestled with by many of the manufacturers with varying degrees of success. This phase of the lubrication of the car is a most important one, in view of stringent regulations being passed against the dripping of oil on streets and pavements, as well as the danger threatening a car in which the mud apron carries a large amount of overflow oil and grease, which in several cases,

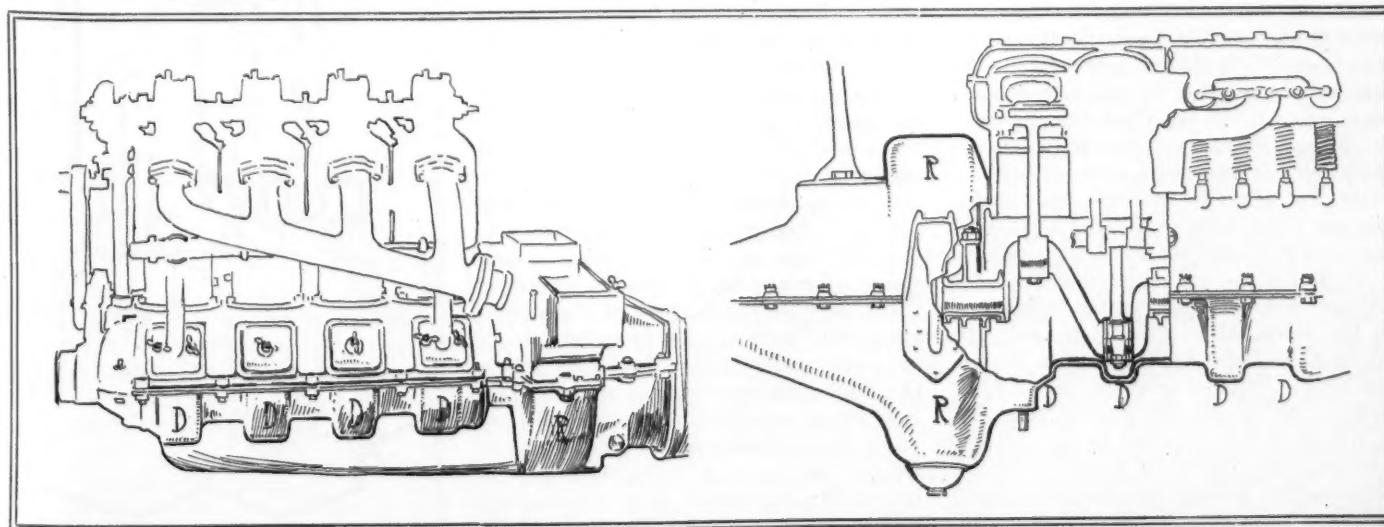


FIG. 10—JACKSON FLYWHEEL OIL SYSTEM

FIG. 9—FORD FLYWHEEL OILING SCHEME

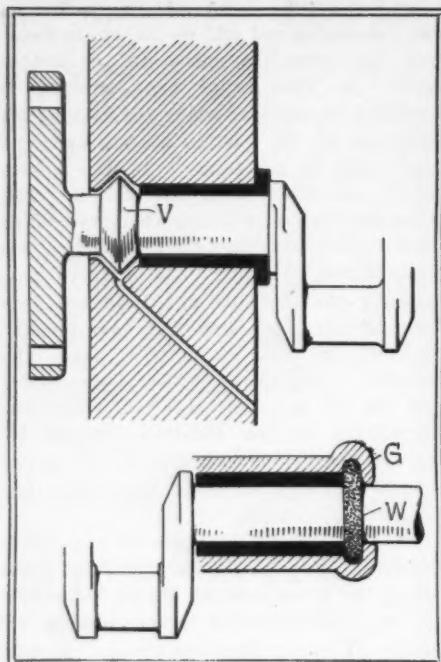


FIG. 11—AMERICAN METHOD TO STOP LEAKAGE
FIG. 12—RELIABLE-DAYTON LEAKAGE STOP

where cars have caught fire from the carburetor, has provoked a grave situation. To avoid leakage at the rear crankshaft bearing, on the American car, there is a ring formed on the shaft between the bearing and the flange to which the flywheel bolts, and which ring V has space made for it by recessing the crankcase. The rotation of the periphery of this ring is at a greater speed than that of the surface of the crankshaft bearing and so the greater centrifugal force throws the oil off into a groove in the crankcase housing from which it leads back through a drilled hole into the crankcase. On the Moon car the oil is prevented leaking past the end bearings by a similar construction. On the Gaeth car the system is the same for the rear bearing but a felt washer is used at the forward end. On the Oakland cars there is a return groove from the outer end of the bearing to the inside of the crankcase, through which all the oil that might overflow is returned. On the Pullmans an oil pocket is formed in the crankcase from which the oil returns into the case and in addition to this felt washers are employed. In the Chadwick the careful fitting of the end bearings for the crankshaft is the only system used to avoid any possible leaking. The Welch cars are fitted with an oil ring formed on the crankshaft and the housing containing it by which the oil is arrested from its leakage and returned to the crankcase. In the Mora felt retainers are used. In the Reliable-Dayton motor buggy a comprehensive little scheme is evolved in which a felt washer W, Fig. 12, is placed at the outer end of the bushing and the retaining cap carries a groove G at its outer end for holding this washer in place. On the Pennsylvania the V-flange is turned on the flywheel end for the pre-

vention of leakage and should leakage occur at the forward end it would enter the half-time housing. On the Moline car the crankshaft bearings are entirely within the oil pan, and any drip from them falls into the pan. On the deLuxe cars felt packing is depended upon at both ends. The Atlas cars have no provision against oil leakage, excepting the careful fitting of the crankshaft bearings in the hard bronze bushings.

Miscellaneous Devices

In addition to what has been said not a few designers employ other ingenious schemes to insure proper lubrication which every maker has at last come to realize is one of the great factors in conjunction with the power plant. On models F and K Jackson arrangements are made whereby, when the oiler is filled, a portion will overflow into the crankcase. This is done by a standpipe within the lubricator, which is of such height that when the lubricator is filled a portion has previously reached the crankcase. On the Gaeth car additional precaution for the oiling of the lower connecting rod bearings is by drilling $\frac{1}{4}$ -inch holes into the connecting rod, lower end, in such a manner as to catch the splash oil and convey it directly to the bearings.

In the two-cycle Atlas cars the mechanical lubricator is driven from the engine shaft, each engine bearing having a separate oil pipe. The piston and cylinder and both ends of the connecting rod are lubricated by one feed pipe, which first feeds through the cylinder on to the piston side, whence the oil drips on to the rotating crankshaft disks and is thrown to the sides of the connecting rods whence it is conducted through channels to the connecting rod bearings.

Holsman's Unique System

The new Holsman four-cycle motor buggy has a particularly unique system. Before detailing on this, it would be well to remember that this motor is of the four-cylinder horizontal opposed type, two cylinders with heads towards the front of the car and two towards the rear. The crankshaft is carried on ball-bearings, and there is one connecting rod for two cylinders, which is carried on roller bearings on the crankpin. The oil is dissolved in the gasoline and which, being fed to the crankcase of the motor, is distributed thence through a spider manifold to the combustion chambers of the four cylinders. The oil being fed with the gasoline into the crankcase by constant spray no provision is made for a surplus supply to accumulate in the bottom of the crankcase, and constantly no provision has to be made against an uneven level within the case when traveling up or down hill. Feeding the oil with the gasoline calls for not a single lubricating precaution, as to whether the motor is being lubricated or not, so long as there is oil in the gasoline. Provisions are made for the supply of oil in the gasoline either from the home, sta-

tion, garage, or from an addition inside of the gasoline tank on the road. In this motor the crankcase is air-tight in every particular, and there being a constant suction within and no outward movement, excepting to the combustion chambers, the possibility of oil escape or leakage is eliminated. Oil grooves are cut in the lower or inner ends of the pistons.

Throughout the chassis parts of many cars the greatest attention has been given by designers on the 1909 products. It is now customary to place compression grease cups on practically every link joint or ball and socket joint in the steering connections, as well as mounting compression grease cups on the steering gear housing. Although a few makers fitted small covered oil cups on the springs for the shackle bolts, a particular change is noticed that in many cases these are made much larger so that this important part may be well cared for.

Universal joints are practically all made oil-tight and dustproof, some of the more advanced ones having steel covers which accomplish this result. In motors using overhead rocker arms evidences of effort to improve the lubrication of these can be seen in many cars by the placing of grease cups on the fulcrum supporting the rocker arms as well as where the lifter-rod hinges to the end of the rocker arm.

A commendable motor construction which tends to eliminate the leakage of oil from the half-time housing at the forward end is the carrying of the fan pulley in rear of the half-time gear housing in the space between it and the motor supporting arm. The advantage of this is that the camshaft has not to pierce the cover of the half-time gear housing. In addition is the advantage that should this covering have to be removed its removal does not interfere with the fan pulley.

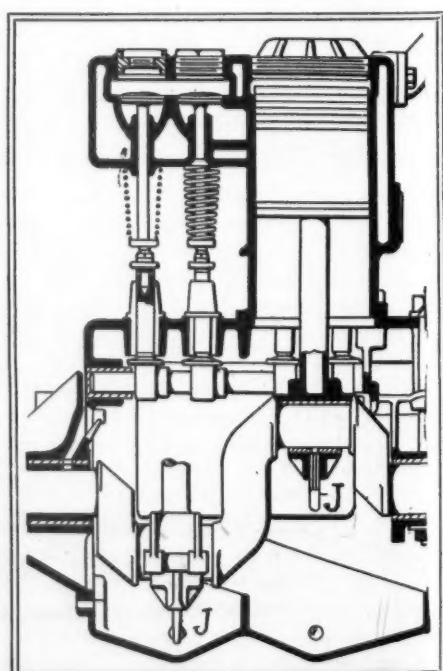


FIG. 13—OAKLAND WRIST PIN OILING SCHEME

MODERATE PRICES POPULAR WITH MASSES

WHEN a dozen years ago a few self-propelled vehicles were cautiously offered to the public, the first buyers were men of mechanical taste who, unable to decide whether or not the motor vehicle had arrived, fully believed that it could arrive and ventured their money in those original crude affairs with little thought and no knowledge as to the possibilities of trouble concealed in the cumbersome looking bodies then supplied.

After a few experiences this class of buyers withdrew, leaving the field almost wholly to those who purchased for pleasure, who expected and were willing to hire a skilled mechanic to care for and operate the machine and who were willing to pay large maintenance bills in order that they, their families, and their friends might enjoy the new method of locomotion, imperfect even though it was at that time. The imperfections have largely passed away, and the superb productions to be shown at the show which opens in Grand Central palace New Year's eve, will partly indicate the well-known fact that a new class of buyers was then created. The touring car, the vehicle able to carry seven passengers comfortably at high speed, across the country, over vile roads, practically as fast as our railway trains and able to make longer trips without stopping for fuel, water or oil, than do locomotives in regular service, will be shown in its highest development by many makers and at a wide variety of prices ranging from \$6,500 and downward through a variety of styles and prices.

Moderate Prices Popular

The vehicles of most popularity, however, will be those which because of their more moderate prices, appeal to much larger classes of buyers. In brief, the year 1909 promises to be an epoch-maker in the production of splendid value in medium weights, powers and sizes of touring cars at prices ranging from the \$850 Ford up to \$1,200 and \$1,500 as exemplified in the Oakland, Mitchell, Regal, Reo and Moline.

These splendid values with others not mentioned at these moderate prices, will bring about a great popularization of the motor vehicle during the next 12 months, which means much for the future of the business and which will go far toward the displacement of the horse so confidently predicted in years past. This great movement toward a more common use of the motor vehicle will spread its effect to many places not directly connected with the motor vehicle industry. The demand for good roads will be greatly augmented; more just and rational legislation will be demanded; congestion in the cities will be somewhat relieved, with consequent increased growth and value to suburban properties, while kindred industries will derive much strength from the large vol-

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Technical Expert A. M. C. M. A.

ume of business sure to follow this popularization of what has now become recognized as a daily necessity.

No great change can possibly take place quickly and the many years required to thus far popularize the motor vehicle simply indicate the greatness of its bearing upon the lives of the people, a greatness which we have scarcely begun to enter into and which will undoubtedly continue to increase for many years. Visitors to this great show will be able to appreciate this year, better than ever before, the great interest which the public are taking in these vehicles designed and built for their pleasure and business.

Bearings on Motor Cars

Ever since wheels were invented the problem of how to overcome the friction effects have been before the world's mechanics. Motor car makers have not been limited by the cost, so have been free to equip their vehicles with the best devices possible to secure and have been certain that among America's wealthy buyers would be found customers for whom the best was none too good. This has resulted in a variety of arrangements of bearings as well as of kinds not ordinarily found in any single piece of machinery.

While for years there have been users of roller and ball bearings, not until the last 2 years has the problem come before the public in large form. The introduction of a type of bearing known as the annular, which is nothing more than the simplest possible form made up in a most superior manner, set a new mark for the makers and called their attention to ball bearings quite forcibly. These annular bearings have been fitted to every possible part of the vehicle from the small accessories such as the pump, fan or magneto, to the most essential parts such as the wheels, transmission, and even the motor.

Because like begets like this use of anti-friction bearings has spurred the makers of roller bearings and of the older adjustable types of ball bearings to renewed activity and borne fruit of great value to motor vehicle users generally.

Many people have doubtless wondered why the ball bearing, unknown practically before the advent of the bicycle, has become so common and is admittedly so good at the present time, with a variety of forms of roller bearings competing for supremacy. The explanation is simple. Both ball and roller bearings must be well made to be long-lived, and it has not been many decades since factories were fitted to turn out such work at prices within reach of the buyers, so the motor vehicle has caused a great step forward in mechanical progress by demanding the best

and commanding prices sufficient to permit makers supplying the demand.

If one ball or roller is slightly irregular or slightly larger than the others it must take all the strain and not only receive damage itself but very likely damage the surfaces on which it rolls. This is why such bearings are all right if they are right, and are all wrong if every part thereof is not right. This is why occasional failure results and why only the most exceeding care in manufacture and in assembling is necessary if the desired results are to be obtained.

Admitting this perfect workmanship, the question still remains as to which is the better, ball or roller, and whether these are to be preferred to the older form of plain, bronze or babbitt bearings, with which the world is better acquainted. On this point designers differ, and each is guided in his selection by the nature of his service, by the conditions surrounding the bearing, by the probable care or lack of care it will receive, the ease or difficulty of lubrication, and largely by the speed of the moving part. In general bearings designed for high speed and free from shock are of the ball variety, while bearings intended for heavy loads and lower speeds are more usually fitted with rollers, leaving the plain bearings for places where the strain is intermittent or in the nature of shocks such as are received by the bearings of an internal combustion engine.

Users of Roller Bearings

That designers are far from universal in following this procedure is shown by the use of roller bearings to all wheels by the Acme, Glide, Stoddard-Dayton and some of the Lambert models, while ball bearings are used by the American, the Austin, Brush, Chadwick, deLuxe, Gaeth, Gearless, Moon, National, Pennsylvania, Premier and some others. Others have balls at one place and rollers at another, and, like the American Simplex and the Marmon, have rollers to the front wheel bearings and balls to the rear, or, like the Mitchell, the Moline, the Olympic and the Regal, have balls to the front and rollers in the rear. In general the use of roller bearings seems to be increasing, although the users of ball bearings have lost no enthusiasm and their use is rapidly extending particularly to the smaller parts.

The fact that the roller gets a line of contact instead of a point renders it more able to carry a heavy load, and thus accounts for a preference in the certain places. The tendency toward the use of ball bearings on the motorshafts seems not to be increasing, although the new Holsman motor employs balls throughout. Unquestionably the anti-friction bearing will do in future a still larger part of the world's work, particularly at the wheels and axles where loss of power is important.



Of paramount importance in the accessory department is the great attention paid to ignition, coupled with the vast increase in the number of magnetos manufactured in America. The majority of these are of the high-tension type, but there is a big following of the low-tension class, and the inductor type, with the Remy as one example, and the Wheeler & Schebler as an example of a different class, is coming to the front.

Remy Electric Co.—Most interesting in the magneto line is the new Remy low-tension magneto, in which the armature, Fig. 5, does not carry the conventional winding, but has instead two crescent-shaped drop-forged pieces P pinned to the shaft at 180 degrees to each other. As the shaft revolves, these revolve. Between them is a stationary coil C containing a few turns of No. 18 wire with a double cotton cover. These revolving inductors, the coil C and the six permanent U-magnets, comprise the sum total of the magneto, as far as current generation is concerned. The magneto is gear-driven from

Ignition Specialties

the camshaft and the inductor shaft is carried on plain bearings. On the rear end of the inductor shaft is the make-and-break cam C, Fig. 3, enclosed with breaker mechanism in a quick removable box with a spring cover. The high-tension distributor is immediately above this, and consists of the usual hard rubber revolving disk with an arc metal brush which distributes to the four high-tension terminals that connect direct with the plug. The current from this magneto is delivered to a non-vibrating coil.

Witherbee Igniter Co.—One of the ignition innovations of the season is the Wico igniter, manufactured by this concern, which, although no larger than a two-unit coil, takes the place of the battery coil and the timer. The make-up of the Wico igniter, Fig. 1, consists of two coils B, a set of magnets A, and a cam C, which takes the place of the ordinary timer in the battery ignition outfit. In this device a magnetic circuit, completed through many turns of fine wire, is simultaneously broken in the center into another path, causing a rupture of the induced current, which finds a pathway through a distributing medium to the spark plug. In addition to this Wico igniter the company's line includes the Volta magneto and Wico plugs, coils, switches, timers, distributors and wires, as well as Witherbee batteries.

C. F. Splitdorf—The 1909 Splitdorf coils do not show any radical change from the 1908 models. The regular type is fitted with a Begert vibrator and the multi-cylinder coil with one vibrator is continued. The 1909 Splitdorf magneto is of the low-tension type, using the regulation shuttle-wound armature carrying only a primary winding and calling for a transformer somewhat similar to the regular spark coil, in which the current voltage is raised. The armature is carried on two races of annular ball bearings and drives from the front end with a breaker box on the rear end. This breaker box, Fig. 2, consists of two cams C at 180 degrees on

the armature shaft, which contact with the roller R on the center of a pivoted lever. On the free end of the lever is one of the platinum points P in contact with the other platinum points. The condenser is carried in the space between the magnets above the armature, and the distributor occupies the usual position above the make-and-break parts. The distributor shaft is carried on ball bearings. The timing is controlled by a lever connected with the breaker box, which rotates the box as well as the roller R ahead of or behind the relative position of the armature.

Bosch Magneto Co.—The 1909 Bosch magnetos are so much like the 1908 ones that these differences can scarcely be discovered in an ordinary examination. These magnetos are built for motor car and motor cycle work. Perhaps the most interesting point in the exhibit of this con-

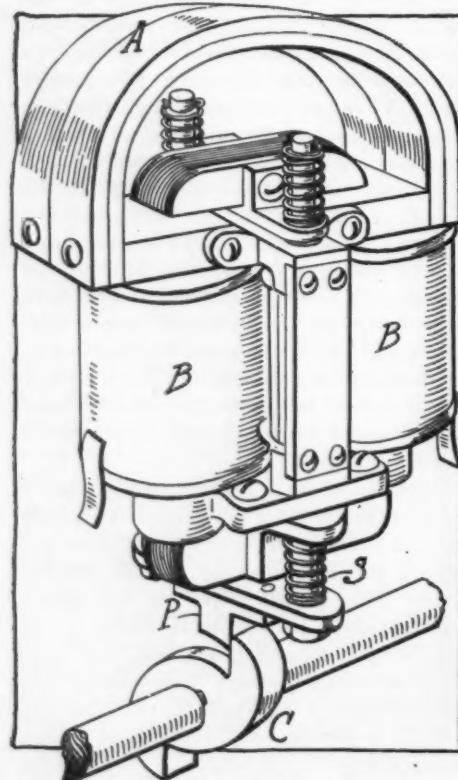


FIG. 1—WICO IGNITER



FIG. 2—SPLITDORF MAGNETO

Department

Magnetos are Popular

ern will be the new magnetic plug system of ignition, in which a low-tension magneto generates a current which is conducted direct to make-and-break magnetic plugs, which thread into the same receptacles that receive the ordinary spark plug, so that without any change whatever in the ordinary cylinder casting a make-and-break spark can be obtained. Each magnetic plug contains a coil within which is one end of a vertical lever, the opposite end being within the combustion chamber and forming the movable point in the make-and-break. The current passing through the coil pulls the upper end of the lever in one direction, at the same time separating the contacts within the cylinder causing the spark to pass. The standard Bosch high-tension magneto is of that type with two armature windings, a primary and a secondary, so that a separate non-vibrating coil on the car dash is not required. The armature shaft is carried on ball bearings, regular U

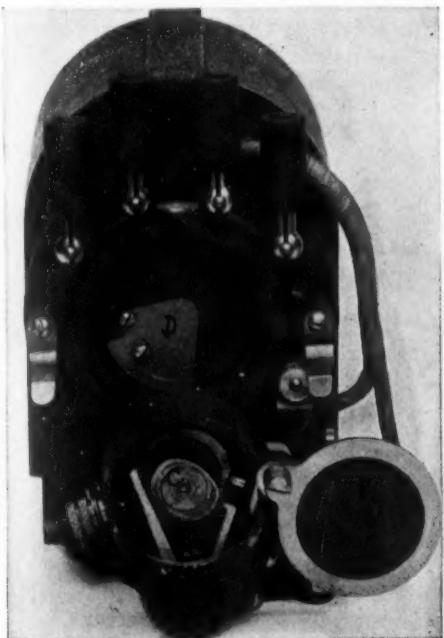


FIG. 3.—REMY MAGNETO.

magnets are employed with the conventional pole pieces forming a housing for the armature. Variations in the timing are accomplished by shifting the breaker box mechanism. The distributor is a conventional one, carried on ball bearings.

Heinze Electric Co.—The Heinze exhibit will consist of various kinds of spark coils for motor cars, in connection with which the latest addition is a new type of kick switch mounted on the front of the spark coil case for operating from the battery to magneto. The big factor in the 1909 product is the Heinze new type of magneto of the low-tension type, generating an alternating current and designed to operate in conjunction with the vibrating coil. The magneto uses three permanent magnets of the ring type, containing arc-shaped pole pieces. Because of this shape the exterior of the magneto is cylindrical in form. The armature runs on Hess-Bright bearings and the peculiar type of winding is shown in the illustration. In addition to this, the exhibit will contain a four-cylinder coil made two and one-half times larger in every detail than the general size of spark coils. Another novelty will be a new instrument designed by J. Heinze to observe the rapidity of the sparks and their even spacing in operation. This is an instrument which is viewed through a screen, or, in other words, there is a small paper tape which runs through the instrument and finally through a case into which one can look, and from which every sort of light is excluded except that which passes through the minute pin holes made by the spark. This instrument demonstrates the number of sparks produced by vibrating coils for every cylinder and of different speeds, and determines the intensity of the first spark at the point of make by the timer in comparison with the following sparks. Another part of the exhibit will be a motor car built for demonstrating Heinze ignition apparatus outside of the building. The Heinze regular and standard A. L. A. M. spark plugs are tested with a high-

tension transformer giving 40,000 volts, and the plug is put under a pressure of 400 pounds per square inch.

J. S. Bretz Co.—The electrical end of this exhibit will include two types of the U. & H. magnetos, fitted with or without the starting device which has been previously described in these pages. These magnetos are of the high-tension type, not requiring any outside coils or transformers, but distribute the current within themselves. The interesting part of the magneto is the starting device, by which it is possible to start the motor on the magneto without cranking. In the breaker box platinum points are used in conjunction with a fiber bushing which strikes the stationary cams as the armature revolves, thereby breaking the primary circuit twice in each revolution of the armature, at which instant a spark occurs in one of the cylinders. These magnetos are made for four, six or eight-cylinder motors, and may

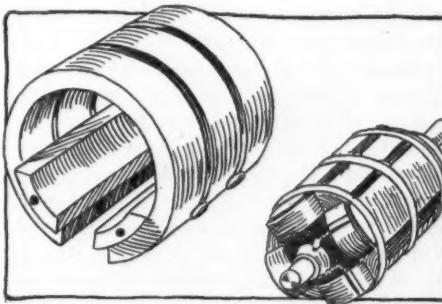


FIG. 4—HEINZE ARMATURE AND MAGNETO

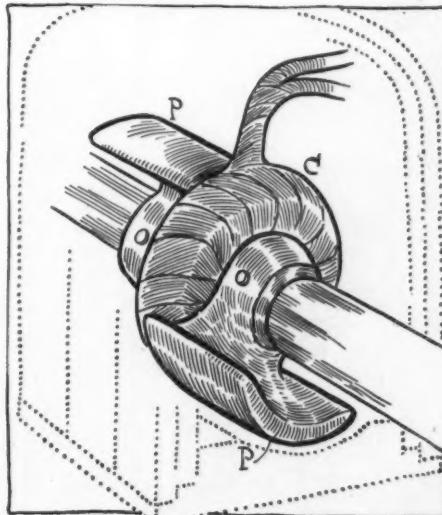


FIG. 5—REMY MAGNETO PRINCIPLE

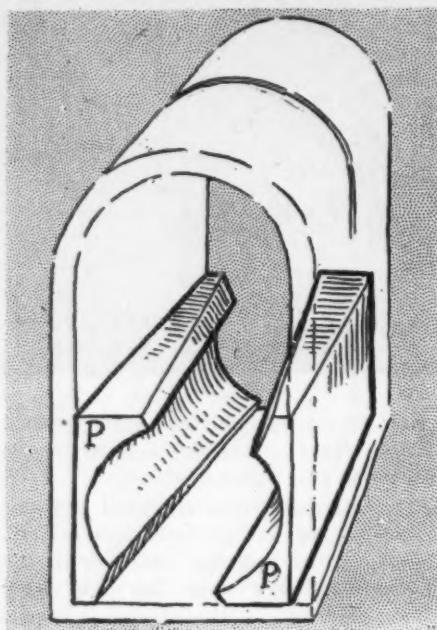


FIG. 6—LAVALETTE POLE PIECES

be driven clock or counter-clock wise. A safety spark gap is provided offering a path of sufficiently low resistance to avoid damaging the armature should the high-tension cable to the plug become disconnected.

Hess-Bright Mfg. Co.—One of the new 1909 magnetos is the Hess-Bright, which is of the high-tension variety but differs from several in this class in that it uses but a single winding on the armature, thereby generating a low-tension current. The magneto obtains recognition as a high-tension, however, in that it carries within the top of the magnets a single non-vibrating coil which acts as a transformer to step up the voltage generated in the primary winding of the armature. Carrying this coil within the magneto eliminates any wiring except that from the magneto distributor to the plugs. A distinctive feature of the magneto is the range of 65 degrees for spark advance and retard, coupled with the fact that at an armature speed of forty revolutions per minute a sufficient spark is obtained. A spark gap is provided to prevent burning out of the

secondary coil and which also serves to assist in locating troubles. In conjunction with this spark gap is a small glass window at the top of the magneto, which shows a spark whenever there is trouble, and, if there is no spark, the interpretation is that the trouble is not with the ignition but with other parts of the motor. Annular bearings of Hess-Bright type are used to carry the armature and distributor parts.

Jeffery-Dewitt Co.—The Jeffery-Dewitt Co., well known as the exhibitor of the Reliance plug in action within a glass of water, will this year show a new design of sparking plug. The Reliance plug for 1909 is slightly changed; however, the essential features remain as before. An improved thumb not N and clip, as illustrated in Fig. 13, replaces the old cap, making a firmer connection. Underneath this cap is introduced a small pellet of high resistance material, which is said to conduct the current from the cap to the quill or central conductor, which makes improved contact with the hair-like platinum wire. The pellet serves the same purpose as an air gap and is claimed to have none of the latter's objectionable features.

Lavalette & Co.—This concern, sole owner of the United States patents on the Eisemann-Lavalette magneto, has two lines of magnetos for next year: First, there is the regular low-tension magneto requiring a second transformer or non-vibrator coil to raise the voltage of the current and which coil can be carried on the dash or any part of the car. This magneto remains practically the same as the 1908 style. The other is the high-tension magneto, which has a double winding on the armature and does not require a non-vibrator coil. These magnetos are made in sizes corresponding to those of the low-tension type, and the breaker mechanism is of the revolving variety. In the low-tension magneto breaker box the lever carrying the platinum point is operated by a steel cam on the armature, the contact between the cam and lever being made through a fiber block to avoid wear. The adjusting of the platinum point is made by a jig composed of a small piece of brass, the diameter of which is equal to the outside diameter of the cam, so that with the jig in place the platinum points must have a maximum gap of $1/32$ -inch. Spark advance or retard in both types of magnetos is by shifting the breaker box. In the new high-tension magneto the pole pieces P, Fig. 6, are cut in a new way of helicoidal form, so that instead of the armature leaving the pole piece suddenly and breaking the magnetic clutch the flux is progressively broken at one end and at the same time progressively re-established on the other side of the revolving armature, this being done to prevent demagnetization. This is further claimed to give the magneto greater power

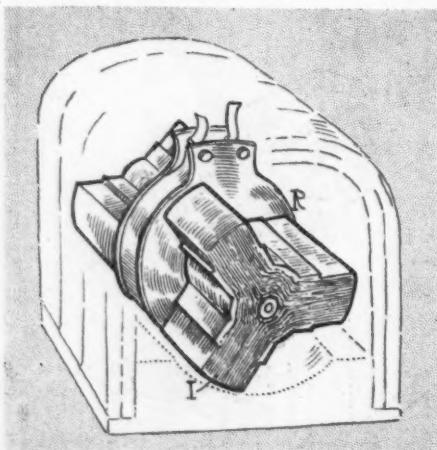


FIG. 8—WHEELER & SCHEBLER MAGNETO

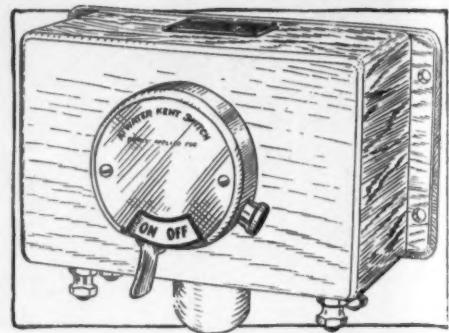


FIG. 7—UNISPARKER COIL

in the retarded position when it is run at slow speed, and also to allow of an earlier spark. This new magneto is fitted on ball bearings throughout, and, in order to provide the best of insulation between the primary and secondary windings on the armature, a high-grade silk insulation has been used.

Wheeler & Schebler—The new Wheeler & Schebler alternating current magneto is intended solely to take the place of a battery for supplying the current to the spark plugs through the same coil and timer as needed in a battery circuit. As shown in Fig. 8, this magneto contains but three essentials—the six horseshoe magnets, two three-arm soft iron inductors I which revolve in the magneto shaft, and a stationary ribbon coil between the inductors. The wings of the inductors I on the front of the magneto are alternated with those of the rear inductor. The shaft carrying these is supported on annular ball bearings and the only revolving part of the magneto is the shaft with these two inductors. The current from the stationary coil R is led to the plugs by way of the timer and multi-nuit coil.

Atwater Kent Mfg. Co.—In addition to the Atwater Kent spark generator, the company has introduced for next year the Unisparker, which is a simplified form of the generator and designed for cars where

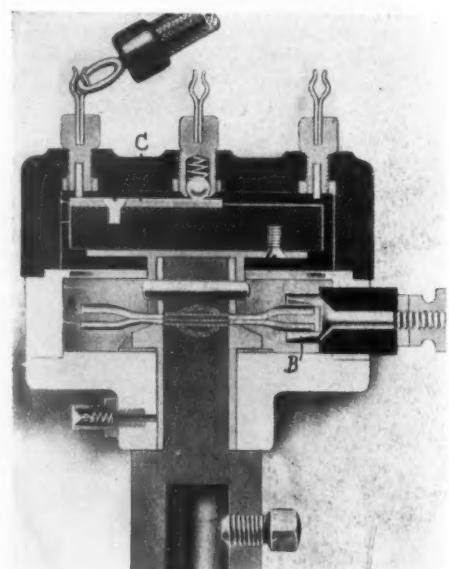


FIG. 9—PITTSFIELD DISTRIBUTOR

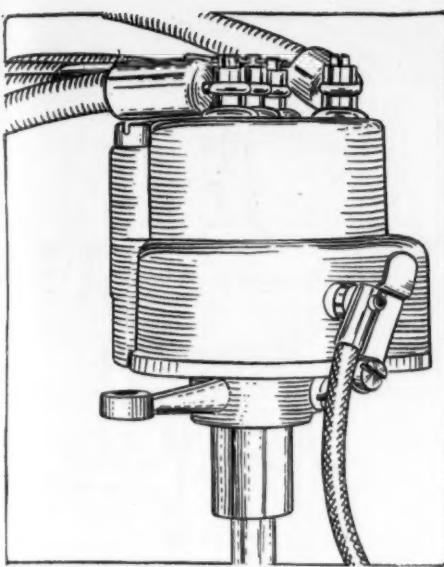


FIG. 10—THE UNISPARKER

the arrangement of the cam or magneto shafts makes it inconvenient to install the regular Atwater Kent spark generator. The Unisparker consists of two units: First, a contact maker and distributor, Fig. 10, adapted to go in place of the ordinary timer on the half-time shaft of the engine; and second, a spark coil, Fig. 7, complete with condenser and switch made to go on the dash of the car. The current used in the Unisparker is taken from six or eight dry cells, a set of which should last 2,000 miles, the reason for which economy being that but one spark per an ignition cylinder is produced, and the contact duration is as brief as will just allow the coil to build up, whether the engine is running at high or low crank-shaft speeds. The contact maker in the Unisparker is the same as that in the regular Atwater Kent system, as are the majority of the working parts, all of which are contained within the timer and distributor carried on the engine. The Unisparker is furnished to run either clock or counter clock wise. The coil-box part of it on the dash is of unusual size, and contains a condenser. In the distributor part four contact posts connect with the spark plug cables and a central revolving part receives the high-tension current from the coil and delivers it to the plugs. The Unisparker is equipped with a special starting device which operates when there is fresh gas in the cylinders. It consists

in closing the switch and snapping the lever to the left against the special contact.

Pittsfield Spark Coil Co.—This company offers for the 1909 trade its high-tension magneto and its timer and distributor. This magneto carries a primary winding on the armature and a secondary coil is housed in an aluminum casing at the rear end of the magneto where it is quickly detachable and can be replaced when burned out. The winding on the armature is such that a spark is given each 90 degrees or quarter turn, instead of each half turn. The distributor is simple, the secondary current being led to the distributor cables directly from the armature by means of metal segments, which come in contact with the terminals of the cables. Each cable ends in a socket inserted in the distributor plate from which the current is led to the motor cylinders. Because of fitting a special timing device, a variation of 90 degrees on the magneto shaft is possible, this being effected by changing the position of the pole. The magneto is driven at camshaft speed. The Pittsfield distributor has four revolving brushes A, Fig. 9, for the primary current, and one stationary contact B, and is located in the base of the case and the revolving distributor disk C is in the top. The revolving part of the distributor consists of four springs, each formed by two opposing shelves across the phosphor bronze with their ends separated sufficiently to contact with the yoked inner end of the stationary segment. The distributor plate of hard rubber rotates with the timer shaft and contacts with the high-tension terminals connected with a plug at the same time that the timer brushes are making contact with the timer terminals. In the Pittsfield timer, Fig. 11, there is but one revolving brush which contacts with the four stationary segments.

Monitor Mfg. Co.—A ball and roller contact timer, Fig. 12, is to be shown by the Monitor Mfg. Co. This device has spring-backed balls B, which are easily replaced, for the terminal contacts and a tapered roller for ground contact. The particular advantage claimed for this timer is longevity by reason of a perfect rolling contact, and with ample bearing surface for the roller. A distributor made by the same firm shows the merit of being compact and very easily taken apart for cleaning. The timing apparatus is on the outside of the distributor case and is operated by a four-point cam.

Federal Mfg. Co.—Rex igniters and Bliss spark coils will be shown by this concern. The Rex igniter is of the armor type and is well-built and substantial, and much resembling the English pattern of accumulators. The company will show other electrical appliances, such as it manufactures.

Electric Storage Battery Co.—This firm will exhibit the Exide battery assembled

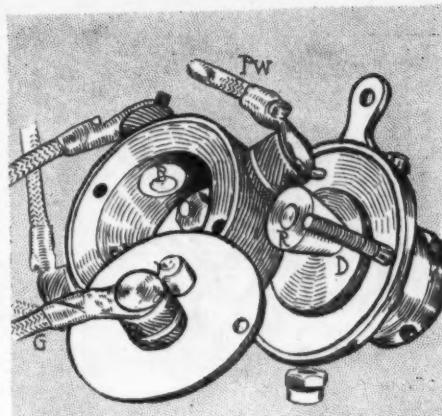


FIG. 12—MONITOR TIMER

in the many types of trays which have been used by manufacturers of electric motor cars. It also will exhibit portable Exide batteries assembled for ignition work and car lamps. This firm also manufactures batteries for the operation of electrical-driven sirens.

Brandenburg & Co.—At the stand of this firm will be shown the Lavigne oil pumps, Wray pumps, and storage batteries. They will show Reading metal bodies, motors, wind shields, transmissions, etc. This concern represents many well-known firms, the motor being of the make of the Milwaukee Motor Co.; wind shields by Ross & Brown, and transmissions by the Compensating Transmission Co. Brandenburg & Co. also will show various other motor car and motor cycle appliances, such as they handle.

Connecticut Telephone and Electric Co.—This firm is well known as the manufacturer of the Connecticut coil and other electrical appliances. Each year it makes it a point to come out with some improvement in electrical appliances for motor cars, and this year it will show a new magneto switch, not unlike last year's

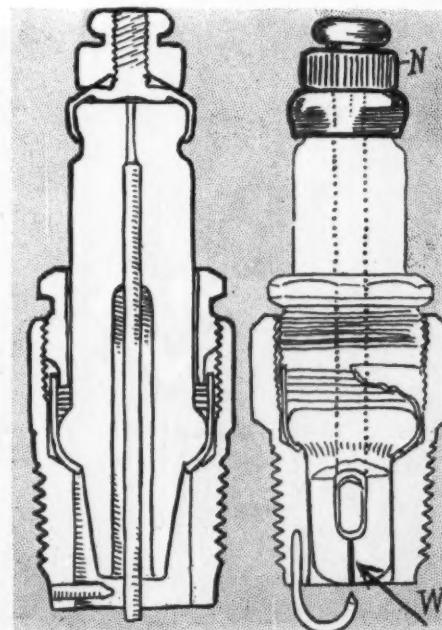


FIG. 13—J. & D. AND RELIANCE PLUGS

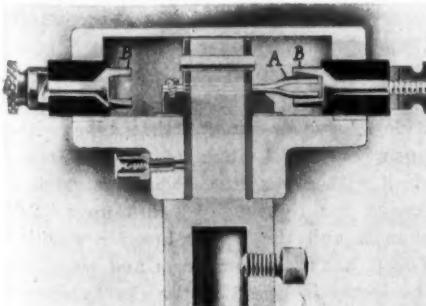


FIG. 11—PITTSFIELD TIMER

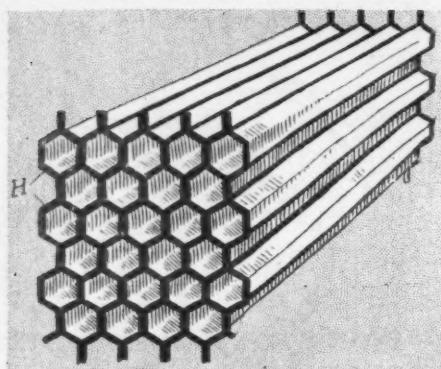


FIG. 14—METAL STAMPING CO. RADIATOR

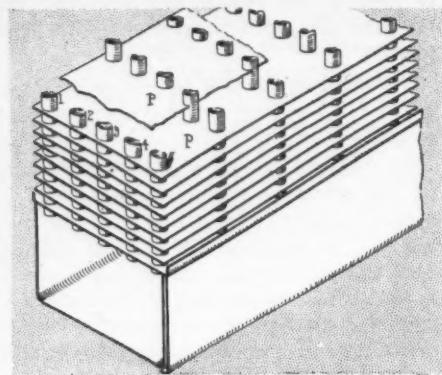


FIG. 15—MCCORD RADIATOR CONSTRUCTION

switch, but greatly improved. In this switch dependence is not put upon the lever proper for contact, but a spring, attached to the same, insures the connection. Also much improvement has been shown by the removal of the three screws to release the name plate for getting at the connections for examination. Other improvements of last year are continued in this switch. Connecticut coils will be shown.

Safety Device Co.—There is an amount of satisfaction to the motor car owner who knows that his machine is safe in the garage until he calls for it again. To insure this knowledge, the Safety Device Co. will show a switch that can be closed only by the aid of Yale key. These switches are manufactured both for electric and gasoline cars and are to form part of the equipment of a number of '09 cars.

Garage Equipment Co.—This firm will show the Depaul timer. Other exhibitors are the Ahern Storage Battery Co. and C. J. Dowling.

Eastern Carbon Works—The Eastern Carbon Works is showing Eastern dry cell batteries, and Eastern battery connections. A feature of the battery connection is the use of a rubber for the connections, which

without the use of retaining nuts will not shake loose. This firm also will show the Eastern ammeters and volt meters.

A. R. Mosler & Co.—At the stand of this firm will be shown the well known Spitfire spark plug and other devices, such as insulators, plug protectors, etc. This firm will also show their roller type of timer and the Mosler distributor.

Autocoil Co.—Of more than passing interest in the exhibit of this concern will be the new battery-saving timer, for which is made extensive claims for economy of current. The usual length of arc of dwell in the timer is 45 degrees, which is necessary in motors with a maximum crankshaft speed of 2,000 revolutions per minute. Touring cars rarely exceed 40 miles an hour on the road and so a 15-degree arc of dwell is sufficient for this work, and a longer dwell means consumption of current. Because of this the timer has connections so that the length may be changed from 15 to 45 degrees—one for ordinary work and the other for speeding. How this is accomplished can be seen by referring to Figs. 16 and 18, in which A and B are plungers which strike simultaneously on the contacts C and D to which the wires connect, the plunger A being in the grounded part of the revolving center and B in the insulated part. B connects with the wire G and thence with a switch for determining the amount of dwell. The dwell by plunger A contacting with the segment C is but 15 degrees, but when the current is switched on to B

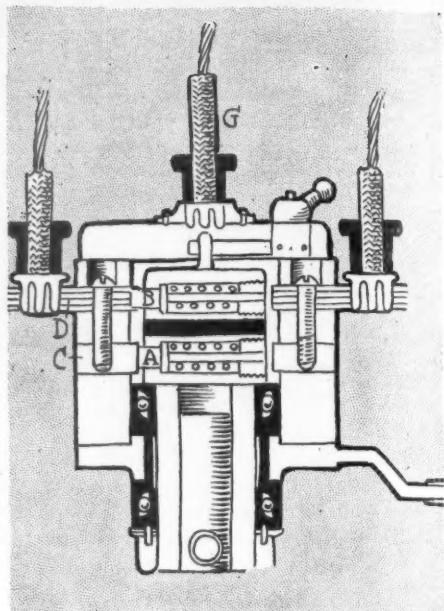


FIG. 16—SECTION AUTOcoil TIMER

and to the segments D it is prolonged to 45 degrees. One of the illustrations shows how contacts C and D are electrically connected by a screw. The four wires from this commutator go direct to the coil primary and the wire G to the controlling switch. The company will also show its timer will be in the exhibit.

American Electrical Novelty and Mfg. Co.—Ever Ready cells and meters, two new articles in the way of bulldog battery connectors, and the Ever Ready bottle are promised here. The bulldog connectors are for use with dry batteries and are a triangular-shape spring connection, which, when pressed together and placed upon the battery pole, holds fast by the



Gemmer Mfg. Co.—This concern has in addition to its regular model C steering gear, two new models designated H and K, both of which are of the worm-and-sector type, this being a radical difference from the old Gemmer gear, which consisted of a nut with internal and external threads, the internal thread lowering a nut, causing the wheels to turn in one direction, at which time the external thread raised another nut. To turn the wheels in an opposite direction this performance was reversed. The two new styles, however, are of that type with a worm on the bottom of the column in mesh with the sector. The H style is intended for light-weight cars up to 2,000 pounds, and the K for heavier machines. The H has a smaller worm and wheel, and the sector is keyed to the shaft; whereas, in the K the sector sits between and is secured to flanges on the shaft.

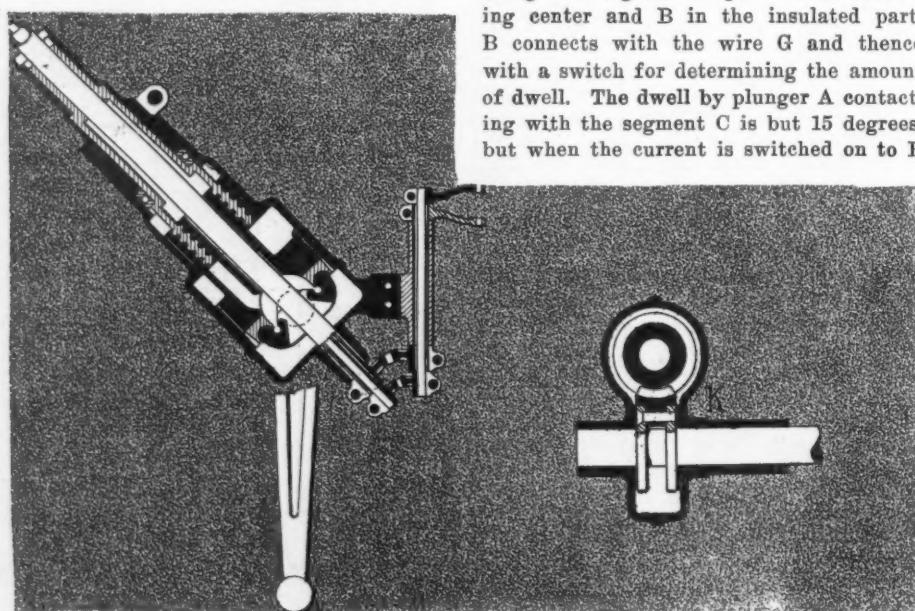


FIG. 17—OLD TYPE C GEMMER GEAR AND NEW K GEAR

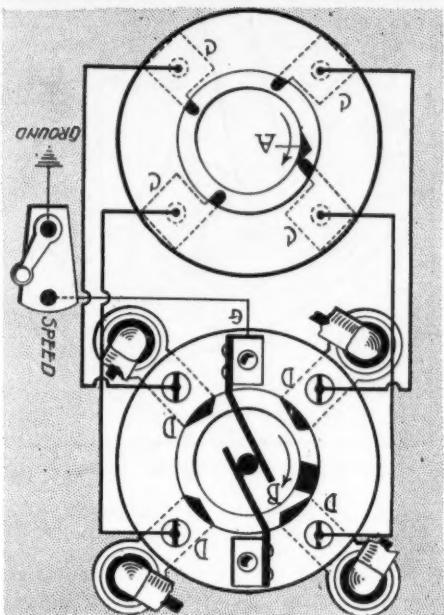


FIG. 18—PLAN AUTOCOIL TIMER

fact of the tension which the design involves. The Ever Ready bottle is for keeping liquids hot or ice-cold as the case may be. These bottles can be filled with hot tea or cold drinks and will remain steaming hot for a day, or ice-cold for several days.

Geiszler Brothers—Geiszler Brothers, storage battery manufacturers, will show a battery with a new style corner post. These batteries are said to have overcome many disadvantages in the way of corrosion of the terminal points. This firm also manufactures ignition outfits, etc.

National Battery Co.—At the exhibit of the National Battery Co. will be shown a new bolt connection for truck batteries.

Cooling Systems

McCord & Co.—McCord radiators are of the vertical cylindrical tubing type, Fig. 15, the water passing from upper to lower tanks through rows of tubings, 1, 2, 3, 4. Additional cooling is lent by horizontal plates P, located $\frac{1}{2}$ -inch apart. Two types of radiator support are illustrated at Figs. 19 and 20, one being a base support on a cross member G of the frame through a bracket H riveted to the water tank of the radiator. The other side support is a bracket B, riveted to the radiator side and resting on the frame member F, the bolt D entering it securely.

Metal Stamping Co.—This company's radiator, Fig. 14, is of the cellular type, in which all of the seamless hexagonal tubes H extend horizontally from front to rear and are inserted at each end in a sheet metal face. The radiator is supported at the sides either by ball and socket trunnion or rigid brackets.

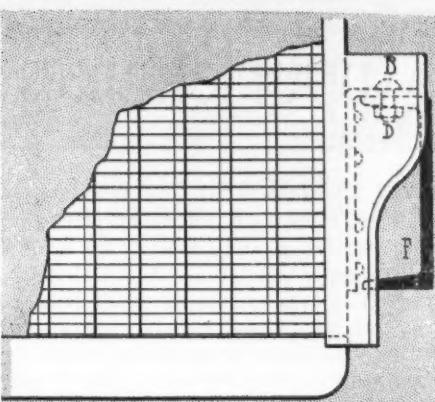


FIG. 19—MCCORD SIDE SUPPORT

The sparking batteries of this firm have been improved and strengthened, larger screw vents being substituted for the smaller ones in the old patterns. This firm also is to show electrical motor lamps and electric fans, etc.

Holley Brothers Co.—On the stand of the Holley Brothers Co. a new 1909 model B magneto will be shown, which is claimed to be superior to other models of this make.

National Coil Co.—Among the various articles to be exhibited by the National Coil Co. will be a new design of vibrator for spark coils. This firm makes a large line of ignition devices and the new vibrator is much more simple than those heretofore turned out. The points are all made of platinum and a few turns of the screw readily releases the vibrator.

National Carbon Co.—The National Carbon Co., which is well known in the ignition line by the fact of its having produced Columbia batteries for a number of years, will show a new battery for ignition work and for operating incandescent lamps. This new battery is known as the Columbia multiple, and several sizes and types in actual operation will be in the exhibit.

Stanley & Patterson—The Stanley & Patterson Co. will have its latest pressed steel wireless dry battery cabinet for motor cars. This cabinet is unique from the fact that no connection wires are necessary, as the box itself is made in

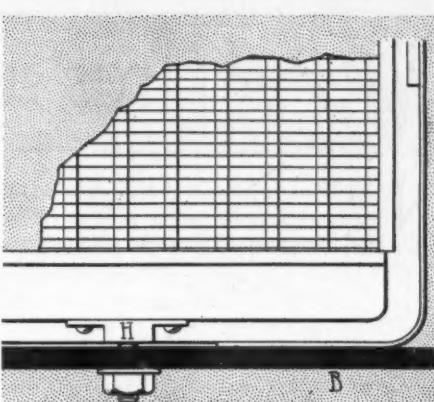


FIG. 20—MCCORD BASE SUPPORT

such a manner as to allow connections to be made through the steel box direct to the battery. No cables are brought through the steel box at all, as these cabinets have the advantage of what is termed "back connection studs."

Lutz-Lockwood Mfg. Co.—A full line of S. X. dry cells will comprise the exhibit of this concern. Because of the great care in the construction of these, as well as their inspection before shipment, a higher than ordinary voltage is claimed for them.

J. H. Bunnell & Co.—J. H. Bunnell & Co., well known in the telegraph and telephone line, will exhibit a new cell which they claim is giving good satisfaction. This cell is of unusual design, being put up in square instead of round cartons. It is claimed this design practically eliminates short circuit trouble in battery boxes. They also will show other electrical appliances they manufacture.

New York Coil Co.—The electrical line of this company consists of its dashboard unit type coil, made for one, two, three and four and six-cylinder motors, its single vibrator coil, its motor cycle coil, and its economic coil for wiper spark ignition.

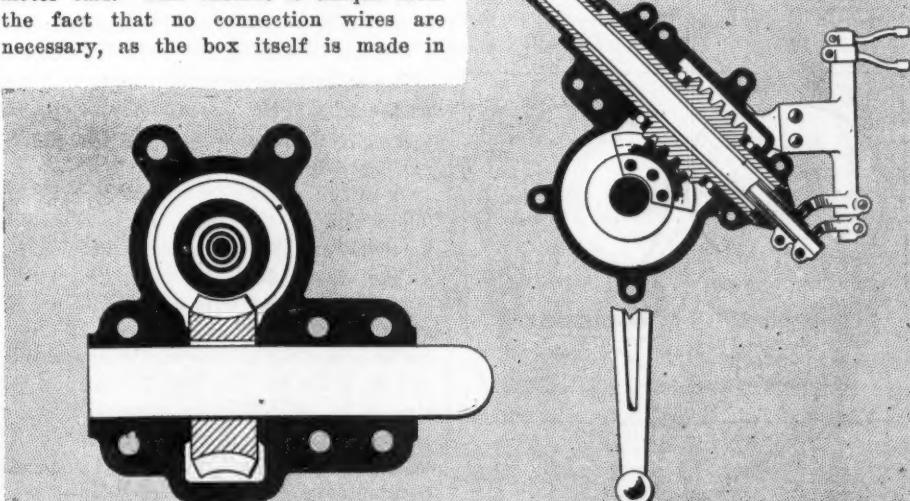


FIG. 21—GEMMER 1909 TYPE H STEERING GEAR

OT Tires and Appurtenances

NEXT year will see a landslide to demountable rims and it is safe to predict that within the next 12 months many new concerns will spring up manufacturing these great time economizers and labor savers on road work.

York Auto Wheel Co.—A new comer is the York Auto Wheel Co., whose rim, illustrated in Figs. 7 and 8, consists of a split rim R carrying the tire with a turnbuckle T for drawing the ends together or separating them. The wheel felloe F has a gap G the entire width of the felloe to receive the turnbuckle when the rim is fitted and a steel brace is attached to the felloe at this gap to strengthen it. The rim R fits in a groove in the wheel felloe and by turning the turnbuckle the rim is clamped in place on the rim. A dust cap P fits over the turnbuckle.

Michelin Tire Co.—Michelin demountable rims are in two styles, termed the commercial and the racing type. In the racing one a split rim carries the tire. The ends of the rim are united by turnbuckle, making the only operation necessary in removing a rim to turn the turnbuckle in one direction, allowing the ends of the rim to slip apart, the rim thus expanding enough to permit of its being lifted off the felloe. A brass plate forms a guide for the ends of the split rim and prevents its later displacement. In the commercial rim or that used on pleasure cars where the minimum speed is not the entire aim, the split rim is not used, but a series of wedges between the felloe and demountable rim at one side hold it on, the wedges being secured by cross bolts through the wheel felloe.

Diamond Rubber Co.—The improved Diamond demountable rim, Fig. 1, consists of a rim R carrying the tire and which attaches to the felloe F by means of several lugs L on the rim which set in recesses in the side of the felloe. The rim is anchored on by cross bolts through the

felloe and lugs L so that removing the nuts on these bolts allows of pulling the rim and tire off at that side. An improvement in the rim is the discontinuance of the blind valve and cutting a slot in the side of the felloe for the valve stem. Where this is cut a supporting brace H is used to strengthen the felloe, held in place by a couple of through bolts. In removing this rim the brace must be removed before the rim can be taken off. There are five lugs L on each rim, so that seven nuts have to be taken off in removing the rim.

Healy Leather Tire Co.—This concern uses a peculiar demountable illustrated in Fig. 5 in which there is no wheel felloe and when the rim with the tire is off the ends of the spokes are bare. Each spoke

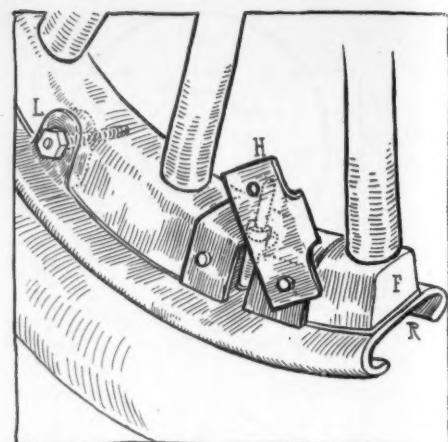


FIG. 1—DIAMOND DEMOUNTABLE

Provisions are made to prevent creeping of the rim TR.

Continental Caoutchouc Co.—The Continental demountable rim is not of the split rim type but in principle resembles the Fisk excepting that instead of the split ring DR a number of wedges are used, each wedge secured by a cross bolt through the wheel felloe. As the nuts on these bolts are tightened the wedges entering between the stationary and demountable rims on one side bind the demountable one in place while a low flange on the opposite side of the stationary prevents slipping off of the demountable on that side and furnishes a clamp in conjunction with the wedges on the other side.

J. H. Sager Co.—A new demountable is the Sager, the product of the J. H. Sager Co. It is designed on the Fisk principle with a removable beveled ring DR, Fig. 2, at one side that forces the demountable rim against a beveled flange FF on the opposite side of the wheel felloe. The beveled ring is held in place by a series of cross bolts H in the felloe with hooked end for resting against the beveled ring and nuts on the opposite ends. In removing this rim the nuts on the hooks are loosened so that the hooks may be turned towards the wheel hub, after which the beveled ring can be pulled off, followed by the tire. Each tire rim has riveted to its inner surface a metal strip with outwardly beveled edges, one of which bears against the beveled flange on the rim shrunk onto the felloe and the other against the anchoring ring.

Stepney and Burrowes Rims—As a rival of demountable rims are the Stepney and

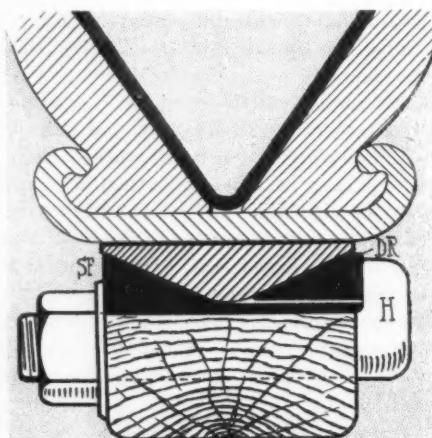


FIG. 2—SAGER DEMOUNTABLE

carries on its outer end a tenon T which is a steel casting into which the end of the spoke fits. The outer end of this is curved to correspond with the back of the clincher rim R. Secured to each tenon is an anchoring lock L held to the tenon T by a galvanized steel bolt with a bronze nut. By loosening this bolt the locker L can be turned partly around to allow the rim R to be pulled outward and off. In changing this rim there are as many nuts to loosen as the wheel has spokes.

Fisk Rubber Co.—The Fisk demountable rim carrying the mechanically fastened Fisk clincher tire consists of the tire rim TR which at the right, as seen in Fig. 6, rests on the stationary rim SR and at the other side on an expanding split V ring DR. As the nuts holding it in place are tightened the ring tends to climb the inclined surface of the stationary rim SR and so binds the tire rim TR on. In this rim it is necessary to remove the nuts holding the expanding ring DR in place when the ring drops out and the rim TR with tire can be pulled off. In putting the new rim on this process is reversed.

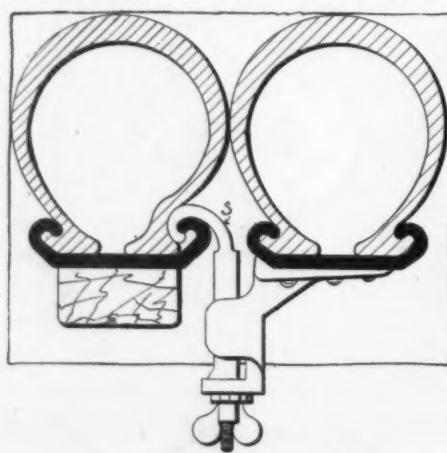


FIG. 3—STEPNEY SPARE RIM

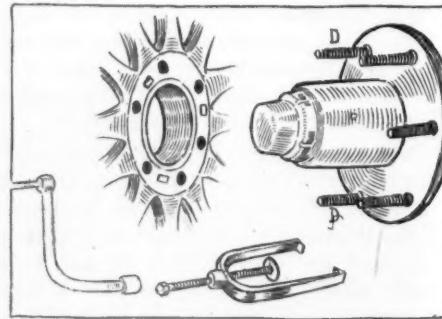


FIG. 4—RAMBLER DEMOUNTABLE WHEEL

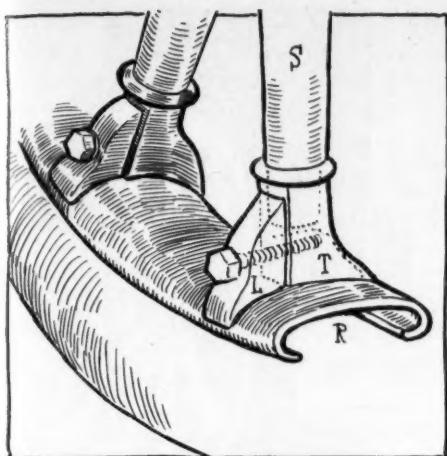
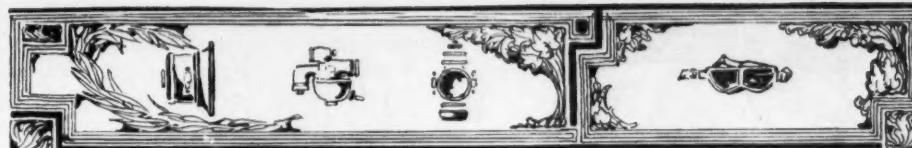


FIG. 5—HEALY DEMOUNTABLE

Burrowes spare rims, both practically alike. The Stepney, illustrated in Fig. 3, consists of a clincher rim carrying an inflated tire which is attached to the clincher on the wheel rim by the hook S, which grips the wheel rim after the tire bead is thrust back. Several of these hooks are distributed regularly around the rim and each, after being positioned, is tightened, bringing the attached rim into rigid position. In addition to this straps from the attached rims around spokes of the wheel prevent any slipping of the Stepney. In the Burrowes spare wheel the same method of attachment is used.

Rambler Demountable—Still another example of the demountable proposition is the Rambler demountable wheel, illustrated in Fig. 4, in which the complete spoke part of the wheel may be removed from the hub in a few minutes by a specially designed wheel puller. The wheel attaches to the hub by a series of six bolts D, which pass through the brake drum, in case of the rear wheel, and directly through the hub part of the wheel. Specially designed lock nuts are used on the ends of these nuts.

Fisk Rubber Co.—Like many of the other concerns in the tire trade, the Fisk company intends to play up its demountable rim, but in doing so it will not forget its usual line of pneumatics. A feature on



the stand will be the exhibition of a 40 by 6-inch tire which is regularly listed by the concern.

G & J Tire Co.—No radical departure in construction is made by the G & J Tire Co. for 1909. There have been a few improvements in mechanical processes used in the construction of the tire which have resulted in added toughness to the rubber tread. The line as it is to be shown at the palace will consist of the standard, clincher, Dunlop and the quick detachable clincher, all of which are furnished in either the smooth or the Bailey tread. New in the line is the Indianapolis G & J motor cycle tire of moulded construction, made in the shape it assumes under inflation. This tire is supplied with corrugated, basket or Bailey treads.

Morgan & Wright—Two new tires and a quick detachable rim are promised by

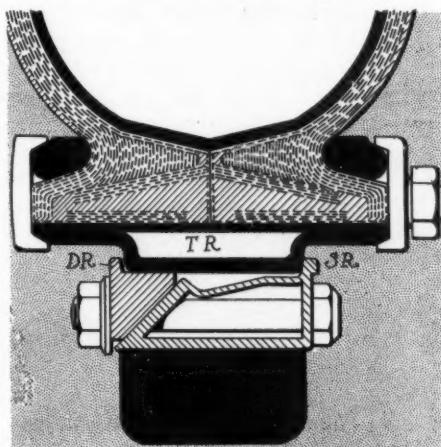


FIG. 6—FISK DEMOUNTABLE

Morgan & Wright. The new rim is operated by snapping or unsnapping a locking ring, the only tool required being a small screw driver or a sharp-pointed file which can be used as a pry. The security of the fastening is entirely independent of the inflation of the tire. A heavy flat tread tire mounted on the standing universal quick detachable rim is an addition to the line. It has extra breadth and thickness in the tread which give increased traction service and puncture protection. This extra heavy tread, it is said, does not diminish the tire's resiliency or increase the liability of fabric separation. Tests are said to have developed an increased traction efficiency in this type over the regular round tread—of as high as 50 per cent in some sizes and an average of 33 1/3 per cent.

Michelin Tire Co.—The full line of the Michelin company for the coming season consists of four styles of pneumatics in addition to two types of demountables.

In the tire line there are the round compressed tread clincher, the flat compressed clincher, the anti-skid clincher, and the quick detachable wire bead type; then, there are the Michelin demountables for commercial wagons and the single-fastening racing type. In addition to the tires there will be a line of Michelin accessories including special tire irons, pumps with gauges, etc.

B. F. Goodrich Co.—The usual line of Goodrich tires which has become so familiar to the public, will be shown in the company's big exhibit. Interesting in connection with it will be the quick detachable type brought out by this company which also produces something new in the way of an improved tire tool which makes easier the task of removing the casing.

Hartford Rubber Works Co.—This concern offers for public inspection its line of tires and rims with which the public already is familiar. No additions to the line have been made but the company is pointing with pride to its quick detachable rim, which will be on exhibition.

Continental Caoutchouc Co.—Strong emphasis will be placed on the Continental demountable rim which will occupy the star position in this company's booth. In addition to this there will be shown the usual line of Continentals, ranging in size from 32 by 4 to 37 1/2 by 5 1/2.

Firestone Tire and Rubber Co.—Solids and pneumatics as made by the Firestone company are expected to make an attractive exhibit in this company's space. Nothing new is reported. The concern being well satisfied with its line—as it now stands.

Zeglen Bullet Proof Cloth Co.—A recent tire novelty is that of the Zeglen Bullet Proof Cloth Co., in which within the regu-

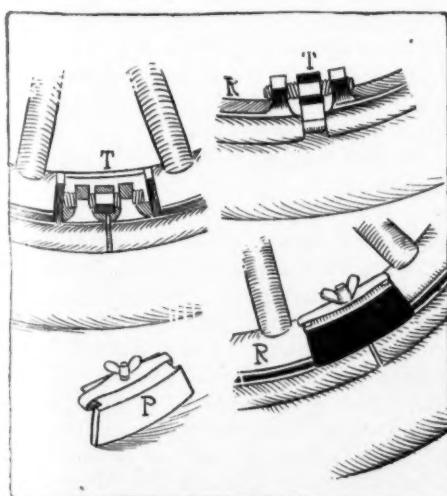


FIG. 7—YORK DEMOUNTABLE

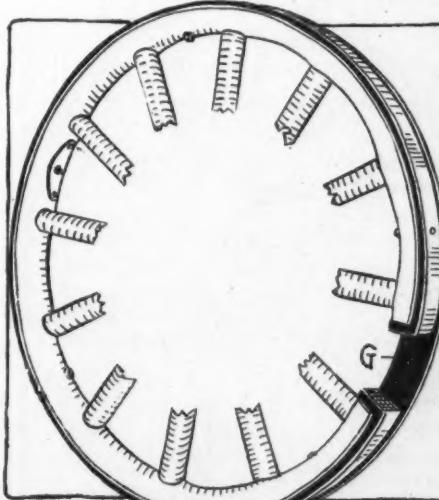


FIG. 8—YORK DEMOUNTABLE

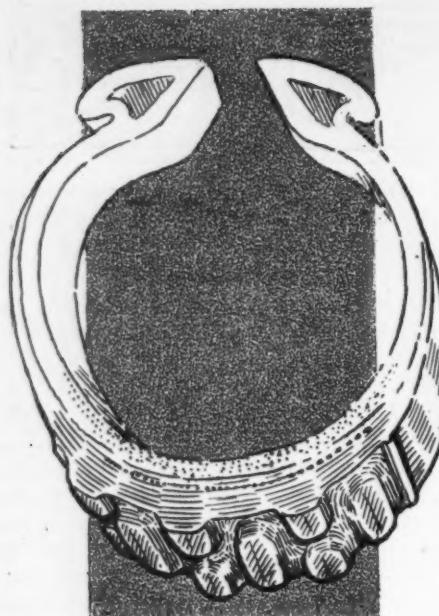


FIG. 9—REPUBLIC STAGGARD TREAD

lar rubber and fabric layers is a layer of bullet proof cloth, made of Japanese silk, the strands of which are capable of withstanding a load of 15 pounds each before breaking. It is this strength feature of the strands which gives to the tire its claimed bullet and puncture-proof features. The silk is four layers deep and is woven very closely on the tread part, but loosely just above the bead. The silk used will withstand a heat of 350 F. and adds practically 25 percent to the tire cost. At present the company is doing the weaving of the cloth in its factory and is having this cloth incorporated in the regular tire casings of some of the tire makers.

Republic Rubber Co.—A rubber tread non-skid tire is one of the features of the Republic company's line. It is known as the staggard tread tire, Fig. 9, the projections on the tread being about $\frac{1}{2}$ by $\frac{1}{4}$ inches by about $\frac{1}{16}$ inch high. They are a part of the main body of the tire and being thus incorporated, they help eliminate the possibility of the tread loosening from the carcass of the tire.

Irving Snell—A new idea will be shown in Snell's resilient double cushion tire, which is designed mainly to prevent skidding. A steel band A, Fig. 10, $\frac{1}{4}$ inch thick and 3 inches wide is bolted to the wooden felloe of the wheel. A 1-inch rubber cushion B is mounted on this band and over this cushion are two other bands C separated by about $\frac{1}{8}$ inch. The rubber cushion is clamped between the upper and lower bands by bolts D which are free to slide through the lower band when the cushion is compressed. The cushioning effect is increased by the fact that there are in the rubber a number of holes which extend throughout its length. The non-skidding qualities are secured by means of ridges G on the outer cushion to keep them from cutting into the tires. Back of the rivet burrs is a protection strip of leather, making three

E of the rubber. These ridges are V-shaped, which permits them to also serve as cleats and thus secure greater traction. As air can circulate between the ridges, it is claimed that this prevents raising as much dust as does an ordinary wheel.

Healy Leather Tire Co.—In addition to the Healy leather tire the company also intends showing the Healy rapidly removable rim. The Healy tire consists of a leather cover completely enveloping the rubber casing and clinching under the rim. To the leather cover is riveted another strip of thick tough leather by means of hardened steel rivets, which are shaped like little cups with sharp edges and rounding bottoms. As the rivets wear down the edges always remain sharp, preventing skidding, while the rounded bottom thicknesses of leather on the tread.

Republic Rubber Co.—Round and flat tread tires in all sizes are to be shown by the Republic company and in addition there will be a rubber tread anti-skid. The Republic line for the coming season consists of regular clinchers and also tires of the split bead type made to fit the quick detachables.

Goodyear Tire Co.—Only one new idea is promised by the Goodyear company for its exhibit in the palace, that being a tire designed for use on electric for which great mileage possibilities are claimed. It is pneumatic and of the quick detachable principle and is made in various sizes to fit the needs of users of the quiet-running rigs. This type of tire received a good workout in the journey from Lincoln, Neb., to New York City, by O. P. Fritchle, in the Fritchle electric, who made the trip this winter. In addition to this electric tire the Goodyear company also will have samples of each one of its line of pneumatics built for use on pleasure and commercial cars.

Consolidated Rubber Tire Co.—A sectional tire which is specially adapted for use on heavy commercial trucks is among the products of the Consolidated Rubber Tire Co. The Kelly-Springfield is of ordinary height and is made up of from thirty to forty independent blocks. This makes

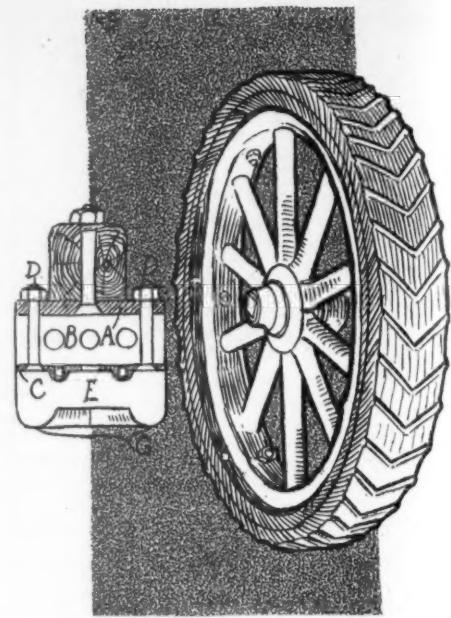


FIG. 10—SNELL'S CUSHIONED TIRE

it possible to effect repairs at trifling cost, for even the unskilled find it easy to replace a damaged block with a new one. There is no metal in the rubber, each block being held by an external frame. Another feature in connection with this design is that because of its construction it will not heat from high speed or heavy load, each block being separate and independent, so that excessive kneading is avoided and the tires are practically air-cooled.

Dow Tire Co.—Dow non-deflation tubes are to be shown. As is well known this non-deflation quality is secured by means of a flexible fabric which is incorporated in the walls of the tube. This fabric consisting of a plastic compound made of feathers and especially prepared cement. In case of a puncture, a fibrous plug mechanically seals the hole.

Swinehart Clincher Tire and Rubber Co.—The new idea to be found at this stand will be a twin tread tire, which is to be exhibited along with the Swinehart detachable and demountable rim. In addition the company will show its line of solid clinchers.

Ajax-Grieb Rubber Co.—Ajax tires in all sizes will be shown but the feature of the exhibit will be a new non-skid of novel construction for which great wearing qualities are claimed.

Swinehart Clincher Tire and Rubber Co.—Featured at this stand will be the Swinehart rim attachment which permits of the fitting of Swinehart cushion tires without disturbing the original rim equipment or changing the road appearance of the car. It is possible with this attachment to use one or more cushion tires in connection with the pneumatics on the same car. In making the attachment, eight bolts come into play which are placed on top of the rim and on the wheel after which the tire rims are thrown into position. The bolts are then easily slipped

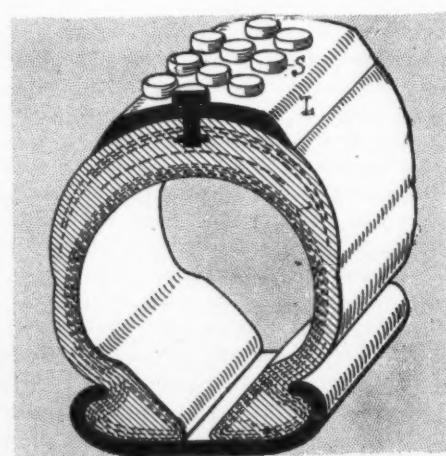


FIG. 11—PENNSYLVANIA STUDDED TREAD

around in proper position and tightened with a wrench, which securely clamps the rim and tire to the wheel. This attachment permits of it being utilized as a spare wheel.

Leather Tire Goods Co.—The self-adjusting Woodworth tread, Fig. 14, an anti-skidding and tire protector device to be shown by the Leather Tire Goods Co. This tread is made of two layers of tough chrome leather with a triple thickness of new, heavy, closely woven Egyptian fabric sandwiched between them. The tread portion consists of steel rivets closely placed to receive the wear. The new feature of the tread is the method of fastening it on the tire. A crimped spring wire hoop SW placed on each side, is fastened to the tread by loops of chrome leather. These loops are fastened to each alternate wave in the wire loop. Another device is the Kant-Skid, Fig. 13, which is made by connecting two chains, ladder-fashion, by cross pieces of chrome leather, double thick, $1\frac{1}{4}$ -inch wide, riveted together by large thick flat-headed rivets. The Kant-Skid is attached to the wheel by means of a strap fastening each chain together. Another idea is the Woodworth special tread for rutty roads.

Pennsylvania Rubber Co.—The construction of the Pennsylvania wrapped tread tire is practically unchanged over that of the past season except that a slight variation has been made in the composition used for the tread, which is designed to give longer life to the tire. The flat tread racing type is a full moulded tire of somewhat heavier construction designed for heavy touring cars or for fast road work. The company also will show a steel-

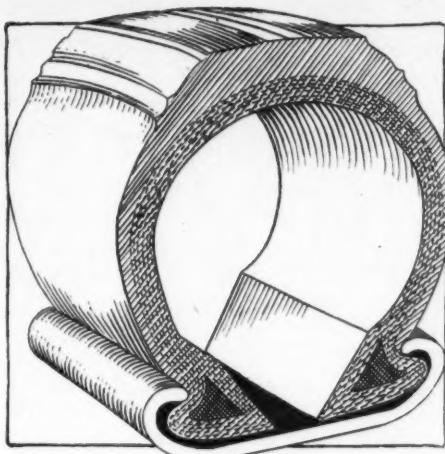


FIG. 12—PENNSYLVANIA FLAT TREAD

studded non-skid type of tire, the durability of which is increased by the use of harder studs S, Fig. 11, than it was formerly possible to obtain. These are case-hardened by a special process which hardens them practically to the center of the head. They are set in a strip of specially-prepared leather L on the tread which encircles the tire and holds them firmly against being pulled out or broken. The company also has a special tire of particularly high-grade manufacture in which there is considerable hand work. It has a white cover of extremely tough rubber and the fabric throughout is of Egyptian cotton with a pure para rubber friction.

Empire Automobile Tire Co.—To the Empire line has been added a leather-covered steel-studded tire, the studs being set within a cut hardened steel washer which gives greater traction surface than the ordinary stud, it is claimed, and is hardened to withstand wear. In addition to its usual line of Empire tires, the company will show motor cycle tires with Bailey and corrugated treads and a line of such accessories as tire covers, tire protectors, tire preservers—in the shape of endless inside pads, electrical wire, special tire tubes, air bags, patches and matting.

Charles J. Downing—Mr. Downing represents several big concerns as a selling agent and in consequence his display will be an extensive one. Among the things to be shown is a tire holder for which much is claimed.

Gilbert Mfg. Co.—Of interest to those who visit the tire section will be a tire cover, spare tire brackets and spare tire locks shown by the Gilbert company. The tire cover is close-fitting and to protect it against water there is a drip flap. It has large snap buttons and is made of heavy enameled duck, with a trimmed leather binding. The spare tire bracket is noticeable because it is adjustable, it being possible to alter the width for holding one, two or three tires. It also can be used for carrying demountable rims.

Weed Chain Tire Grip Co.—This concern has brought out a special grip for

high wheel motor buggies and also an anti-skid device for solid tires. It is stated by the company that it has improved its product by employing in its manufacture a superior grade of cross chain, specially hardened, which, it is said, gives from two to three times the amount formerly secured. Outside of this the entire grip remains as it has been for the last four years.

Garage Equipment Co.—In the way of anti-skid devices, the Garage Equipment Co. will call attention to its emergency mud hooks which are made in two styles, one for pneumatics and the other for solids. These mud hooks, as their name indicates, are for use on roads where the mud is deep or there is lots of sand. One hook goes on each wheel and there is a projecting flange which digs into the dirt and gives the traction desired. These hooks are made of malleable iron, weigh 5 pounds per set, and will fit any tire from $3\frac{1}{2}$ to 6 inches. Usually the projecting lug is 2 inches but where the clearance between the fender and the tire is not enough to accommodate a large one a 1-inch lug is provided. The mud hook designed for use on solid tires has a lug which projects only 3-16-inch beyond the tire. From four to six on each wheel are recommended when solid tires are used.

Standard Welding Co.—Rims of all sorts will be found in the exhibit of the Standard Welding Co. They are made of seamless steel and come in the detachable, demountable, removable and standard clincher types. The standard clincher rim is made for all styles with elastic bases. The Goodyear is a four-piece universal rim

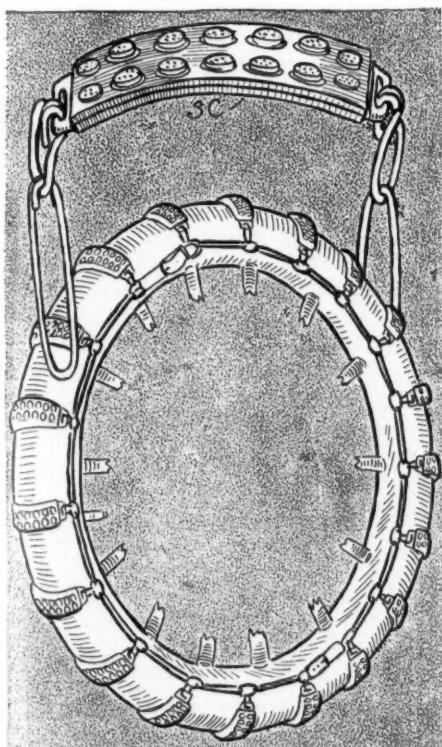


FIG. 13—THE KANT SKID

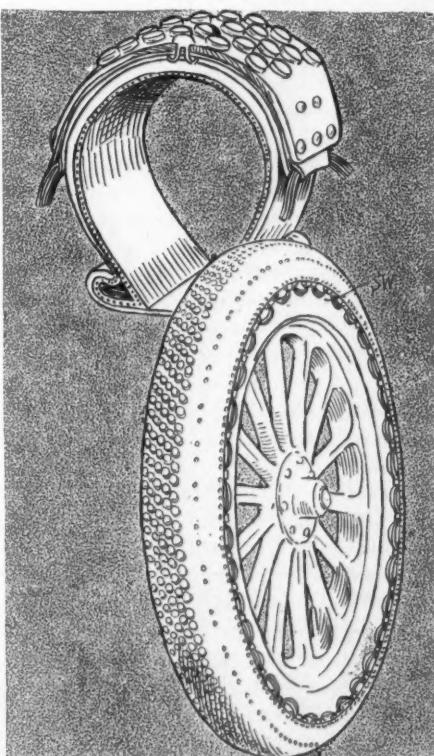


FIG. 14—WOODWORTH ADJUSTABLE TREAD

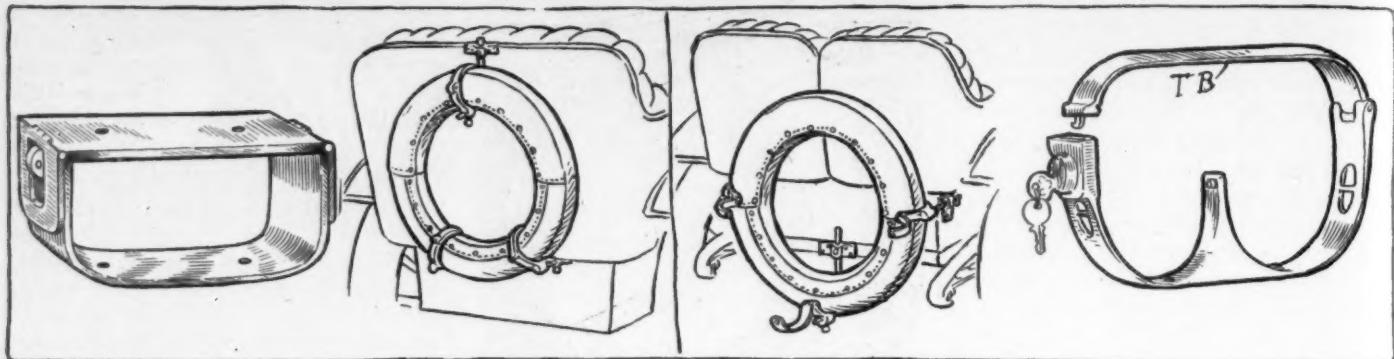


FIG. 15—NATHAN TIRE TRUNK LOCK

FIG. 16—ALLEN TIRE HOLDERS

FIG. 17—ALLEN TIRE LOCK

with elastic or inelastic bases; the Goodrich is a two-piece side ring detachable rim; the Firestone is a four-piece universal detachable rim; the Trident is a side ring detachable rim, and the Crescent is a removable one. In addition this concern also makes the Fisk.

Allen Auto Specialty Co.—A motor car for road service is not fully equipped without a supply of extra tires. To afford convenient holders for these, the Allen Auto Specialty Co. will show tire holders suitable for attachment to almost any part of the car. These holders are so constructed that they will accommodate large tires with demountable rims, or tires or space wheels which can be locked in place, thereby decreasing the chance of loss by theft. In this exhibit also will be shown tire covers for every type of tire, as well as for spare wheels. Fig. 16 shows the Allen tonneau tire holders in two styles; Fig. 17 shows the tire lock with the curved top bar TB; in Fig. 20 is a new covering for Stepney rims with enlargements P for the Stepney attachers; and in Fig. 22 is an adjustable holder for one tire at H and for two at HI.

Nathan Novelty Mfg. Co.—Of new design is the Nathan tire and tire trunk lock, which permits of either the trunk or the tire being fastened to the running board. In case the motorist does not possess a trunk for carrying outer casings, this lock can be made to clamp over the casing and, thus is protected from theft. The Nathan tire trunk is made of hardwood filled with special water-proofing and is finished similar to the body of the car itself.

Ennis Rubber Mfg. Co.—Although the Ennis tire has been on the market but 1 year, the company is prepared to make an elaborate display in the palace. It will show its line of motor car pneumatics and inner tubes and probably will show motor cycle and bicycle tires which it has just started in to manufacture.

Wilson Trading Co.—This concern is the distributor of the Federal tire in greater New York and will display the line of tires in connection with its accessories exhibit.

Courtney Rubber Co.—A line of extra heavy flat tread and anti-skid tires will be shown as well as the inner tubes which

go with these pneumatics. Considerable hand work enters into the manufacture of these tires. The Courtney anti-skid consists of a triple line of steel studs, the feature of which is that it is possible to re-tread the tires.

Guaranteed Faultless Auto Tube Co.—The palace show will mark the introduction to the public of this tube. This device consists of an inner tube which contains three other tubes, all connected by a simple valve. In case of puncture one of the three reserve tubes is pumped up and the motorist is on his way with but little delay. There being four inner tubes he will have to have four punctures before it will be necessary to remove the casing.

Batavia Rubber Co.—Tires, inner tubes, and tire protectors will make up the exhibit of the Batavia company.

Standard Leather Wasner Mfg. Co.—Prominent on the stand of this company will be its tire pump and Everwear and Blanco tire bands. The Maison Gris tire pump is built to produce 100 pounds pressure in the tire without much labor. The Blanco band consists of a strip of rawhide tanned by a special process. It is 5-32 inch thick

and is claimed to be free from grease and oil usually associated with rawhide. The Everwear tire band is a strip of four-ply extra heavy woven canvas $\frac{1}{8}$ -inch thick, to which is cemented with waterproof cement a layer of mechanical material tanned leather. The band is then studded with hard steel rivets. The finished band is $\frac{1}{8}$ inch thick over all. The studs projecting about $\frac{1}{8}$ -inch and fitted with heavy brass eyelets and slotted to permit close adjustment to the shoe.

Brown Co.—In these days when the average motorist realizes the importance of keeping his tires pumped hard the necessity for having a positive method of accurately determining the pounds inflation is apparent. Figuring this way, the Brown Co. is introducing for the first time a tire pressure indicator which is simple in operation. To determine the tire pressure, this device is secured on the valve stem of the tire and the contact of the valve plunger with a similar device in the post of the indicator, the air is allowed to pass into the gauge. At the same time, the pump can be applied to the other end of the indicator and every pound forced into this registers itself on the gauge.

Merchant & Evans Co.—The feature of the exhibit of the Merchant & Evans Co. will be its new idea, the Star metal tire case, which is something entirely new. As will be seen by the illustration, Fig. 18, the metal casing is divided into two sections, R C being the rear part and C the cover. T is the outer casing, while I T shows the inner tubes snugly tucked away in the space inside the outer casing. The casing is fastened at the sides by catches and is locked at the top, which makes it proof against theft.

Comptoir D'Innovation pour Autos—A decided novelty in the circulating pump tire is the Guenther circulation pump to be shown by the Comptoir D'Innovation pour Automobiles. This pump, the subject of a sketch, consists of an enclosed loose blade B pivoted off its center, the pivot P being placed at the edge of a circular revolving disc D. This pump will ensure freedom from trouble caused by particles of wood, dirt or grit, which by carelessness gets into the water tank. It would not obstruct the circulation of water by

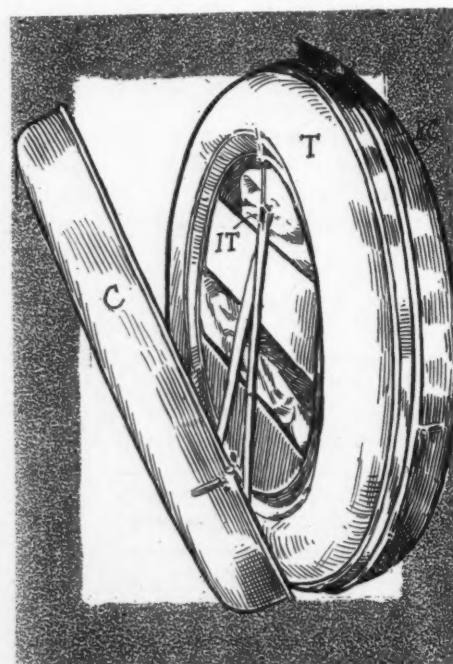


FIG. 18—STAR METAL TIRE CASE

the thermo-syphon method should the pump shafting become deranged. This exhibit also will show the tire inflator Delpeuch, a mechanically operated tire pump, the Nightingale whistle and a water jacketed air compressor.

E. T. Burrowes Co.—To avoid tire trouble delays and to obviate the necessity of changing tires on the road, the E. T. Burrowes Co. has brought out a spare or emergency wheel, to which is fitted the tire already inflated. This wheel, carried on the car as an extra casing would be, can be attached to any wheel having a deflated tire in a few moments without the use of a jack or much energy.

C. A. Shaler Co.—To have a tire vulcanized has generally meant shipping it to a large city, with express charges added to the cost of vulcanizing. This is obviated by the use of the electric vulcanizer, to be shown by C. A. Shaler Co. These vulcanizers are made for either direct or alternating currents and can be used by simply attaching to any electric light socket. The heat desired is controlled by a rheostat and with the simple directions accompanying each vulcanizer, repairs can be easily and cheaply made.

Dayton Rubber Mfg. Co.—The product of this concern is styled the Dayton airless tire, which feature is secured by means of a series of slit rubber ribs B, Fig. 21, which fit inside the casing and support it. The principal points about the 1909 tire are that it has a smooth round tread which is thicker and stronger than in 1908 and a thicker casing or outside covering, which prevents the ribs from protruding under a load. These ribs have been made stronger and wider and the fastening cord has been done away with. Also the V-shaped opening in the rib has been closed up to a mere slit, to permit the base of the tire to be expanded and removed from the metal form over which the tire is built. There also is a wider base so that the tire will stay firmly on the rim.

Auto Tire Inflating Co.—Two sizes of tire tanks are to be displayed, the feature of which is a combination regulating valve which permits of easy opening and closing, and which is said to be proof against leakage. The tank is filled with carbonic acid gas and has a capacity of about 1,600

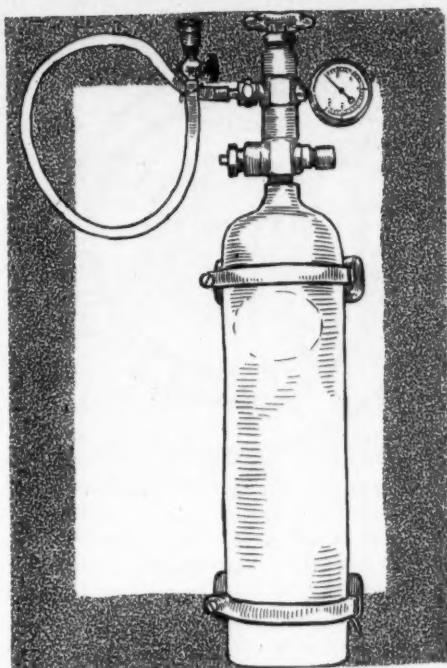


FIG. 19—AUTO TIRE TANK

pounds. It is claimed that the tank will fill twenty 26 by 4-inch tires.

Traver Blowout Patch Co.—It sometimes happens that hard luck with tires uses up the extra shoes with which most touring cars are equipped. To quickly repair blown-out tire shoes, the Traver Blowout Patch Co. manufactures a patch of fabric and rubber combination which fits perfectly inside the shoe and which is

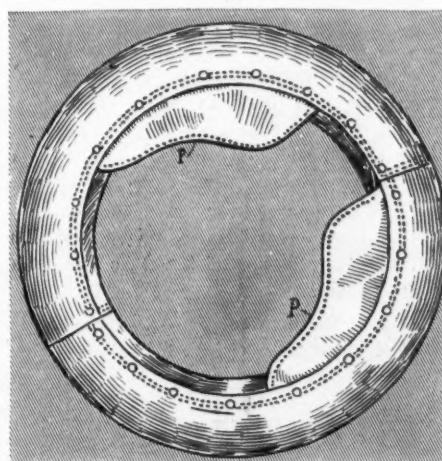


FIG. 20—ALLEN STEPNEY CASE

equipped with a metal flange on each side to fit between the tire shoe and rim. A friction surface to the patch prevents creeping. This device takes up but little room in the repair kit.

Seamless Rubber Co.—In addition to its Kant Leak inner tubes made of para stock this company handles a chauffeur two-finger mitt, an outside blow-out patch for tires, emergency tire patches, tubing for lamp generators, vulcanizing cement, repair fabric, horn bulbs, and other tire accessories.

Newmastic Tire Co.—During the year the Newmastic Tire Co. has improved its tire-filling process by increasing the quality of glue used to the extent of 10 per cent, and a similar increase in the quality of the glycerine employed, the result of which is a more elastic tire. A 36 by 4-inch tire filled with Newmastic is increased in weight 35 pounds. This filling will stand a heat of 270 degrees of Fahrenheit and is put in the inner tube of the tire at a temperature of 125 degrees Fahrenheit. Not more than 2 minutes is required to inject the filling into the tube which is put in with a pressure of 85 pounds on the rear wheels and 70 pounds on the front wheels. This filler is not a rejuvenator of worn out tires, but is used in new tires and partially worn ones, the policy of the company not being to use the filling in worn out casings.

Pneu l'Electric Co.—The electric pneumatic tires of this concern are made in all standard metric sizes with plain and other treads.

Other tire exhibitors are the Sampson Leather Tire Co. and the Motz Clincher Tire Co., both exhibiting their regular line of pneumatic tires. The Sampson Tire Co. will exhibit its line of protective treads.

Brandenburg & Co.—The Lavigne oiler on exhibition by this concern is the same for 1909 as it was for 1908, and is of the multi-feed type made in three styles: First, is the Lavigne standard made with bleeder tests and with the feed adjustment outside of the oiler. Second comes the Lavigne special without bleeder tests and having the adjustment inside of the oiler, making it imperative to lift the oiler cover to make the adjustments. Third, is the Lavigne Duplex fitted for sight feeds on the dash.

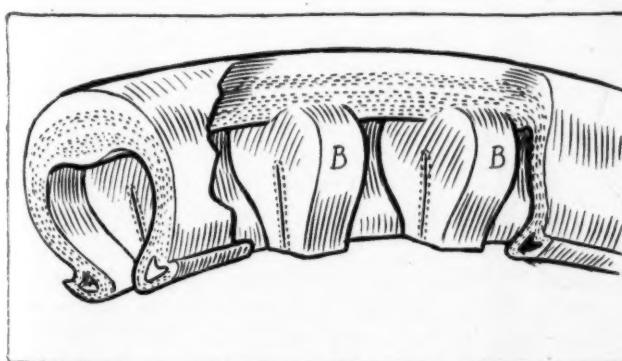


FIG. 21—DAYTON AIRLESS TIRE

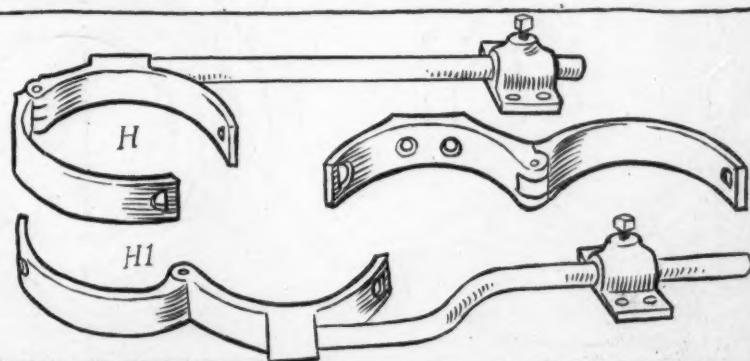


FIG. 22—ALLEN TIRE HOLDERS

Ball and Roller

IMPROVEMENTS noted in ball bearings for 1909 consist in several cases in increasing the number of balls in a given size of bearings as compared with the number used this year; and the use of metal separators between the balls, forming a separate cage for each ball. In roller bearings one of the noted advances is the manufacture of the short length bearing which occupies the same space as the annular ball type. In the R. I. V. annular ball bearing the balls are carried between the one-piece inner and outer concentric races within grooves in the opposing surfaces, but the spacer is an anti-friction ring cast around the balls after they are in their proper position between the two races. By a special scheme the balls are then loosened in the anti-friction spacer and can revolve freely. The balls in these bearings are of high carbon crucible steel.

New Departure Mfg. Co.—In its double ball race bearing this concern uses an inner ring A, Fig. 5, with two ball grooves V in which are races of balls separated by the ring spacer S made in V form with holes on either side forming ball cages, the balls in one race alternating with those in the other. The outer race is a three-part one of two cup pieces B, one for each ball race, and a cover C spanning the tops of the pieces B and holding them together. Ten balls are carried in each race. In its exhibit booth the company will demonstrate the dual work these bearings perform by being capable of carrying loads at various angles by 1,000-pound flywheels. In this work the bearings will be forced to carry the load at every angle from radial to absolute thrust. On exhibition also will be a transmission set which has seen 16,000 miles of road service.

Hess-Bright Co.—Hess-Bright bearings for 1909 are in two styles. The new one brought out this year, Fig. 1, has each ball

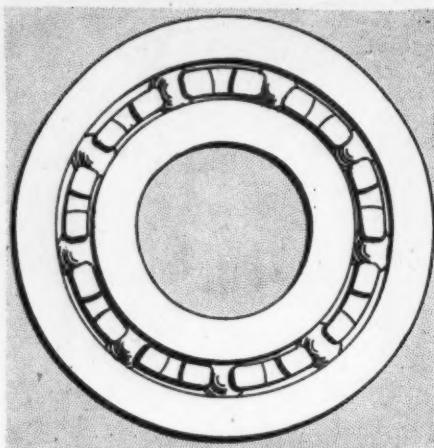


FIG. 1—HESS-BRIGHT BEARING

in a cage of its own and the old style with spring separators between the balls. In the new cage type the separator is made in halves, one half entering between the balls at one side of the bearing and the other at the other side, the halves then being secured together. The new magneto bearing has a one-piece inner race, but a two-part outer race.

Standard Roller Bearing Co.—The Standard Roller Bearing Co. in its annular ball-bearing employs one-piece inner and outer races and carries the nine balls in a spacer C, Fig. 2, which is made in halves riveted together, the halves having semi-circular curved parts for the balls. Standard alloy tool steel is used in the balls. The company continues its full type of annular ball bearing in which the balls are introduced through a recess in the outer race. Its line includes the improved Grant conical roller bearing with solid rollers supported in end carriers with individual sockets for the ends of the rollers and which ends are riveted together, forming a cage for the rollers. The cone has a wide shoulder against which one end of the roller carrier has a bearing which shoulder has the same degree of bevel as the ends of the rollers.

Timken Roller Bearing Axle Co.—Most interesting in the line of Timken roller bearings is the short length bearing illus-

Bearing Status

trated in Fig. 4, which is made so that it is interchangeable with the different makes of annular ball bearings and can be fitted where they can. Its design is the same as the present Timken bearing with the rollers carried in separate cages in a one-piece metal stamping. The Hyatt roller bearing for next year will be the same as this year, each roller consisting of a strip of steel wound into a coil or spring of uniform diameter. Because of the flexibility of the roller it presents a bearing throughout its entire length. This bearing will be used in transmission and rear axle construction of many cars next year.

J. S. Bretz—This exhibitor of the F & S annular ball bearing will show the new type which differs from the previous one in the employment of a die-cast separator for the balls by means of which it is possible to get many more balls into a bearing, which has been one of the aims of makers of annular ball bearings. Each ball has a separate cage.

Keystone Lubricating Co.—Greases will be the main exhibit of the Keystone company, but in addition to these will be shown a transmission gearcase operated by a motor and which is packed with No. 3 Keystone grease, this idea being to demonstrate the claimed efficiency of grease over oil; also to be shown at this stand will be grease from its liquid to solid states. In addition there will be a line of grease cups in all styles and sizes.

Hydraulic Oil Storage Co.—The garage system evolved by the Hydraulic Oil Storage Co., and which is to be shown in the palace, is designed to eliminate all gasoline valves. This system, known as the Snell hydraulic, is based upon the difference in the specific gravity between gasoline and water, and the fact that they do not mix. The tank always is full of liquid and the fact that there is no air to come into contact with the gasoline prevents a loss by evaporation and protects the tank from possible explosions by fire, electric spark or lightning. In order to prevent water or dirt being drawn in the clean oil is drawn from the top of the tank above the water head. There also will be shown a model of the system the company is installing in the New York taxicab garage.

H. T. Alexander & Co.—This concern is a licensed manufacturer of Panhard oil and its exhibit will consist of oils and greases of this particular brand for motor car and motor boat use.

Garage Equipment Co.—The Perfect combination oil and grease gun is featured on this stand. The device is made of heavy seamless steel tubing with malleable iron top and bottom, while heavy leather

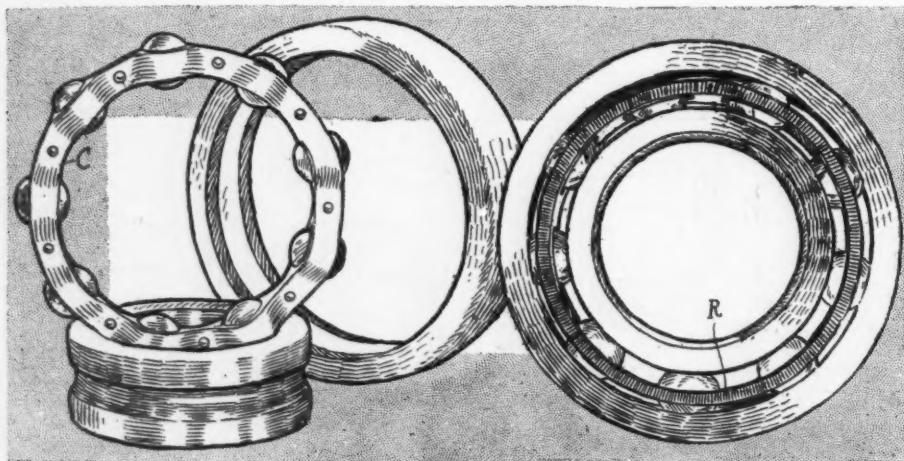


FIG. 2—STANDARD BEARING

FIG. 3—R. I. V. BEARING

washers are used in the plunger as a packing and on the pump between the cap and barrel. When the gun is used for grease it is operated by means of a crank. A gear on the crank is thrown into mesh with a rack on the pump plunger and it is operated by turning the crank, this securing a very high pressure. When it is used for oil the gear is slid out of mesh with the plunger rack and the plunger worked up and down in the usual manner. This gun also can handle gasoline.

Havoline Oil Co.—The familiar line of Havoline lubricants is displayed by the Havoline Oil Co., but in addition to this the company has a special line of highly filtered cylinder oils which have been filtered to a crystal white color. In addition to this there will be shown a line of lubricants which is made especially for the Packard company. Designed for use in White and Stanley steamers is a 700 fire test superheated steam cylinder oil made from Pennsylvania crude.

A. W. Harris & Co.—Several different grades of gas engine and superheated steam cylinder oils will be found at the space occupied by A. W. Harris & Co. These oils have played a prominent part in the winning of several big road expositions this year and are put up in cases the feature of which is a handy device for pouring the oil. Also exhibited will be the trans-compound for transmission sets, and motor grease and graphite greases.

Joseph Dixon Crucible Co.—The number of uses to which graphite can be put as a lubricant will be demonstrated at the exhibit of the Joseph Dixon Crucible Co. There is a flake graphite, to be used with lubricating oil in the proportion of a teaspoonful to the pint for crankcase lubrication; graphite cup grease; graphite wood fiber grease for gearcase purposes. In addition there is the Dixon chain compound for chains, and the pipe joint compound for exhaust pipes which are connected by a threaded union.

New York and New Jersey Lubricant Co.—In addition to its general line of non-fluid oils the New York and New Jersey Lubricant Co. will exhibit for the first time its Motorol brand of cylinder oil in four weights—extra light, light, medium and heavy. Its regular line includes two grades of lubricant for half-time gear housings and universal joints, and a special lubricant for water pumps which is a waterproof production with a high melting point.

National Tube Co.—Many of the features of the exhibit of the National Tube Co. will be the same as were seen in the sesqui-centennial exposition in Pittsburgh, among which are some special pieces which have been made by inserting small pieces inside of larger pieces in varied designs. In addition to these, the company will exhibit Shelby tubing for motor car axles, twisted tubes, polished tubes, brazed tubes,

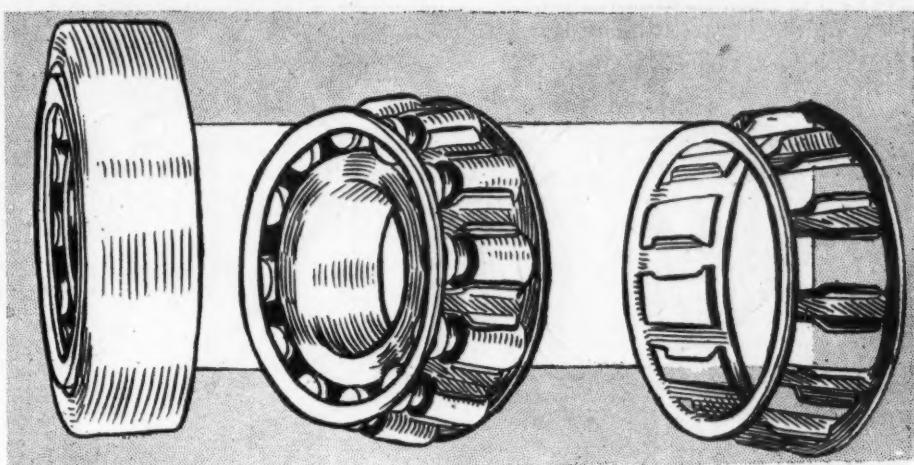


FIG. 4—TIMKEN SHORT-LENGTH ROLLER BEARING

coiled tubes, tapered axles, upset rear axles, gongs, etc. In addition there will be flanging and expansion tests of Shelby tubing.

Light Mfg. and Foundry Co.—This concern is a specialist in the manufacture of motor car metals, such as aluminum, manganese bronze and bearing metal castings, and all of these will be displayed. The exhibit will include the various types of aluminum castings for crankcases and gearboxes and other castings made from manganese bronze.

Sier-Bath Co.—Gears, sprockets, parts, German chrome nickel steel and phosphor bronze bushings will make up the exhibit to be made by the Sier-Bath Co., a motor car machinist concern which makes a specialty of sprockets, gears and gear cutting.

Quincy-Manchester-Sargent Co.—This concern specializes on two wrenches, the Auto-ele and the Titus-ele, the latter a recently brought out smaller and cheaper duplicate of the former. These wrenches consist of a breast plate, offset midway of the staff for revolving the wrench; and a set of different size sockets for fitting

over the nuts. Because of the wrenches having a particularly long staff it is possible to get at nuts within the crankcase and other parts of the motor. The sockets are made of cold-drawn steel and are graded in size to suit the nuts used on motor cars.

American Metal Hose Co.—Flexible metal hose is the specialty of this concern which is a successor to the New York Flexible Metallic Hose and Tubing Co. Promised for the palace show are several styles of the flexible metal hose which can be used for various purposes—oil feeds, cooling purposes, exhaust purposes, speedometers, horns and coils.

Perfection Wrench Co.—Perfection wrenches are of the sliding jaw type, made for nut or pipe use. The one-piece jaw and shank is a steel forging and the sliding jaw together with the rack bar are of similar material. A friction spring prevents the sliding jaw from shifting of its own weight, and retaining pawls prevent its moving away from the nut. The wrench can be set so that its action is similar to a ratchet one, making it unnecessary to remove the jaws from the nut when moving the wrench to get another hold.

Coes Wrench Co.—This company will exhibit its usual line of jaw and shank wrenches, in which the sliding jaw is threaded to take the adjusting screw, which screw is turned by a thumb nut N.

H. & C. Bottle Mfg. Co.—The Janus bottle is based on the principle that a vacuum is a non-conductor of heat, and in order that the bottle can be used to retain liquid in a warm state for hours on cold days, or in a cold state for hours on warm days, it is necessary to use a double bottle. It consists of an outside metal case, a cushion inside of it, then a vacuum space, and lastly the bottle. The bottle at the bottom rests on a rubber cushion and is further prevented from injury by an asbestos vacuum support.

S. B. R. Specialty Co.—This concern will exhibit the S. B. R. muffler cut-out.

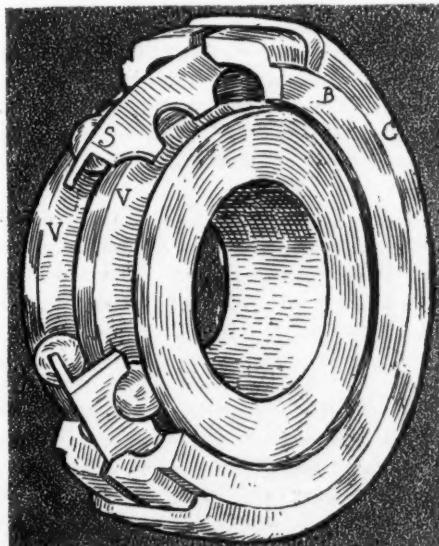
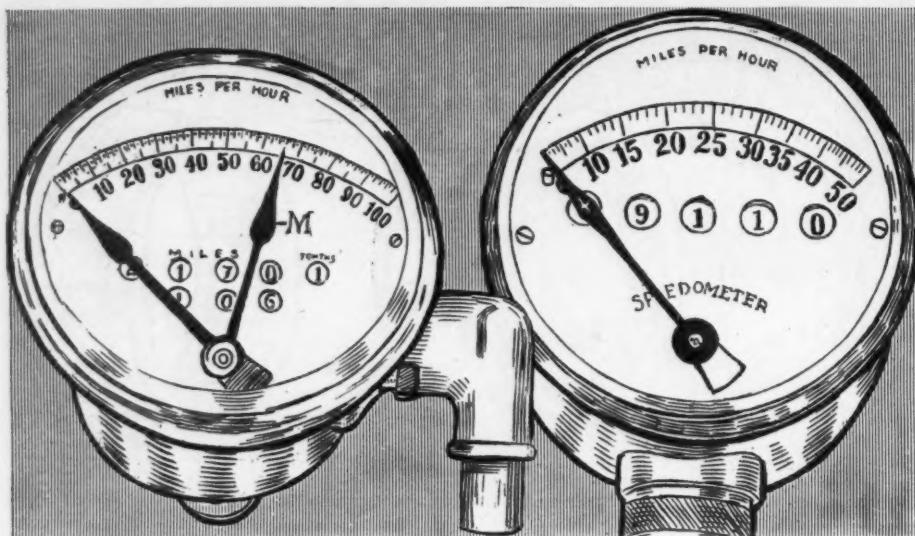


FIG. 5—NEW DEPARTURE BEARING



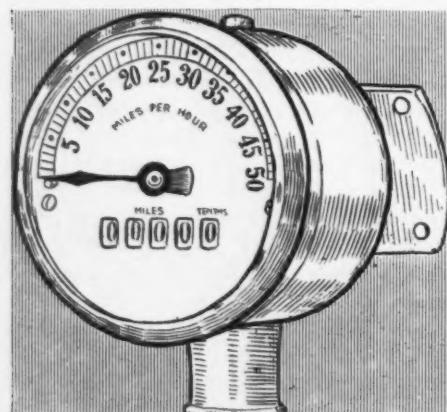
JONES No. 16

JONES No. 27

MOST important in speedometers is the use of the maximum speed hand, the incorporating of the odometer within the instrument, the increasing of the season odometer to 99,999 miles in some cases and the reduction in price. The price is the big thing, for now \$15 instruments are marketed by several makers; \$25 machines are common and the high-priced ones have suffered a price reduction.

Warner Instrument Co.—The new magnetic recorder of the Warner Instrument Co. is entirely of different shape, although the operating principle of the revolving magnet is maintained. The instrument now has a circular dial with a slot in the upper right through which the rotating of the speed dial can be seen. Incorporated within the instrument are season and trip odometers, the season one recording to 99,999.9 miles and the trip one 999.9 miles. The instrument is made with clock combinations, the clock directly over the speedometer casing.

Stewart & Clark Mfg. Co.—This concern has introduced in addition to its centrifugal force type a magnetic one No. 11, in which the indicating hand is carried in the center of the dial with the speed scale forming almost a complete circle. It is fitted with a season and trip odometer and



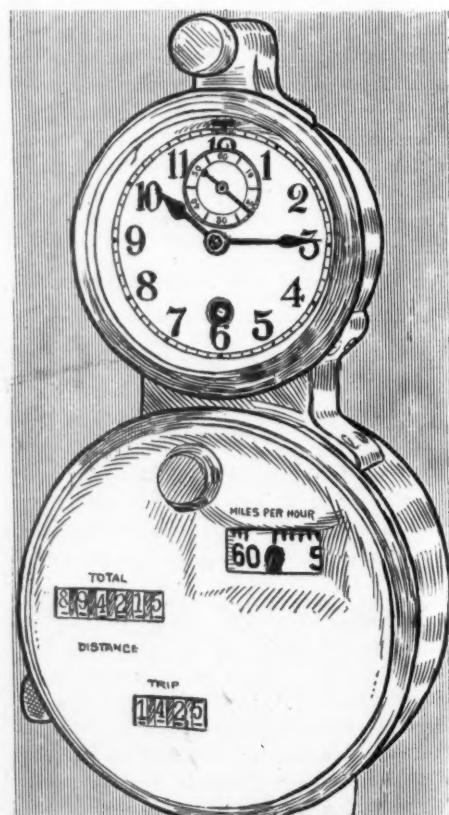
EVER READY RUNABOUT

Speedometer Exhibits

the clock is in the center of the dial. All of the other models use the regulation indicating hand pivoted in the center of the dial, with season and trip odometers in the lower part of the dial excepting in the cheap runabout type, which only has the season odometer. All of the instruments use the straight vertical shaft drive.

Hoffecker Co.—The new 1909 product of the Hoffecker Co. is the Hoffecker Twin, a combination of Hoffecker speedometer and Chelsea clock. In order to illustrate the steadiness of the indicating hand the company has ready a jolting device consisting of two speedometers running from the same motor, one instrument rigidly mounted on a pedestal and the other mounted on a machine which constantly bumps it up and down and sideways in order to demonstrate that oscillations of this nature do not interfere with the steady action of the indicator needle.

Veeder Mfg. Co.—The Veeder Mfg. Co. continues its liquid type of instrument in which colored wood alcohol or kerosene is contained in a reservoir at the lower end of the instrument. Beneath this reservoir is a small centrifugal pump driven by the flexible shaft. A passage leads from the liquid reservoir to the center of the pump and from the periphery of the pump to the calibrate vertical scale. The action of the



WARNER MAGNETIC TYPE

a new trip-resetting feature introduced for next year, by which a slight pressure on a plunger causes the register to be reset at zero. The company's line of instruments operating on centrifugal force principles are in three models, Nos. 4 and 5, with 60 and 90-mile dials and furnished with the new reset and maximum speed hand M as well as enclosed season odometer, and the No. 12, a cheap instrument with a 3-inch dial, a 50-mile scale and direct drive through the base. The 60-mile instrument and the new magnetic type are marketed with clock combinations.

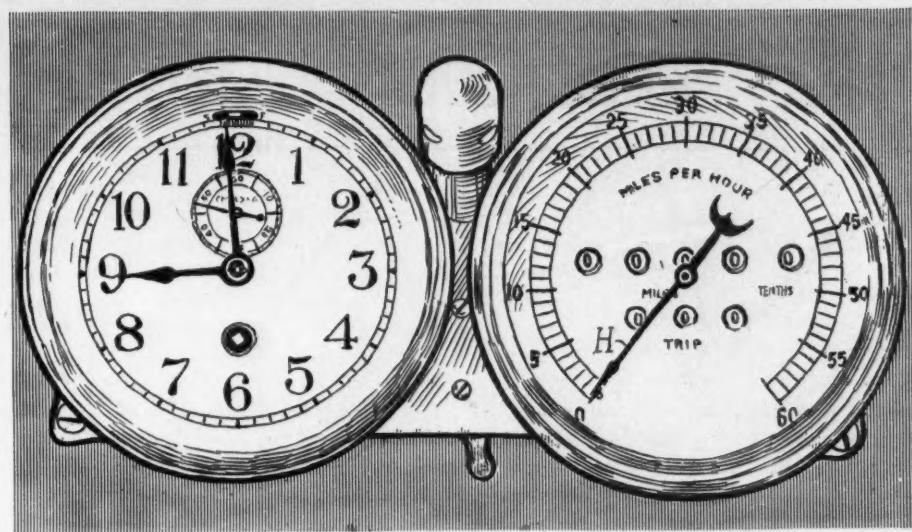
Jones Speedometer—The Jones speedometer will be marketed in twenty different styles of instruments, the three new ones being designated Nos. 27, 28 and 29. Nos. 27 and 28, indicating speeds up to 50 miles, are of the straight drive type and contain season odometers up to 9,999.9 miles. No. 27, the cheaper instrument, is without a trip odometer, but No. 28 has one reading to 99.9 miles. No. 29, the third new instrument, registers up to 60 miles per hour and has season and trip odometers the same as No. 28. It will be noted that all three of the new instruments are of the straight base drive type without a right-angled joint in the flexible shaft at the side of the case as in the old models. Nos. 14 and 15 have scales for 50 and 60 miles and with contained odometers.

Auto Improvement Co.—The Auto Improvement Co. continues the manufacture of its centrifugal force instruments in which are incorporated odometers made at the Berlin factory of the company. The great improvement in all of the instruments is the new direct drive odometer, which is made without a spring in its entire construction but which operates on a series of gears. In its Universal model the indicating needle is not a pointer carried as the hands on a watch but a floating point supported from beyond the periphery of the dial. In this instrument

Divers Accessories

pump is to raise the liquid in the sight gauge in proportion to its speed. All mechanical parts are carried on ball bearings and all joints are above the liquid level when it is at rest.

Shore Instrument and Mfg. Co.—A standard measuring instrument to test the hardness and strength of metals is the Scleroscope which is to be shown by the Shore Instrument and Mfg. Co. This device is intended to be used in selecting material and to inspect the finished product. The underlying principle of this device is the falling and rebounding of a tiny jeweled drop hammer, moving freely within a highly polished glass tube. After it has been sucked up to the starting point by the rubber suction ball at the top the hammer is caught by a hook which holds it until it is released by the bulb at the base, at which time the operator is ready for his test. The hammer falls about 10 inches and on striking metal it will rebound more or less in exact proportion to the varying hardness of the different metals and alloys as well as hardened steel. The instrument may be used in any manner, either free-handed or detached from its tripod frame. It also can be put on a swing arm for a vice, plate or bench work. In addition to measuring the hardness of the metal the device also is intended to show the power



STEWART NO. 10 MULTIPOLAR TYPE WITH CLOCK

of a metal to resist compound strains, such as are imposed on axles, gear teeth, punches, dies, etc.

C. A. Buffington & Co.—Third seats, as they are termed by C. A. Buffington, are to be shown in that concern's space in the palace. By the term "third seat" is meant an auxiliary chair which is often found so convenient for use in the tonneau when extra passengers are to be carried. They come in various heights, 7½, 11, 15 and 17 inches, and when not in use can be folded up very easily and stowed away, not taking up much room. These third seats are finished in carpet, but the line Buffington & Co. are making their play on is upholstered in imitation leather and of different colors. These chairs are the ones distinctly designed for motor car use.

Royal Equipment Co.—All styles and sizes of the product of the Royal company are to be displayed, consisting of raybestos, which is an oilproof, greaseproof and waterproof friction facing for motor car brakes and clutches.

Raimes & Co.—Metal polish handled by Raimes & Co. will be displayed, it being the intention of the concern to decorate its booth with a huge facsimile tin of its globe liquid polish, 5 feet high and mounted on a pedestal surrounded by dummy tins of all the globe sizes in both paste and liquid form.

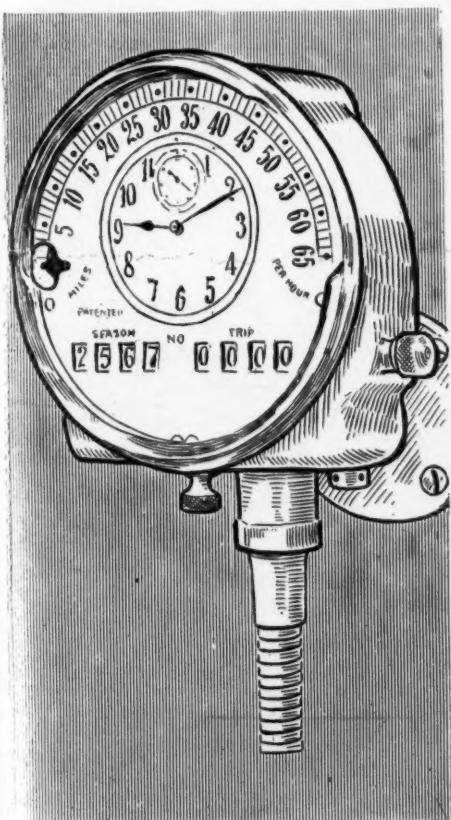
Burnet Compound Spring, Inc.—Something new in the way of springs is promised by the Burnet people, which consists in reality of a double elliptic with a single leaf at the bottom of the top spring and at the top of the bottom one. It is easily attached by means of a clip at the top of the frame of the chassis, while another clip at the bottom fastens to the axle. Through the use of this spring it is claimed the need for shock absorbers is done away with. Among the claims made for it is that it does not require any more room than the ordinary springs and does not

raise the body of the car any higher than usual. The proportion which the upper springs bear to the lower one permits of free compression, the other resisting undue expansion.

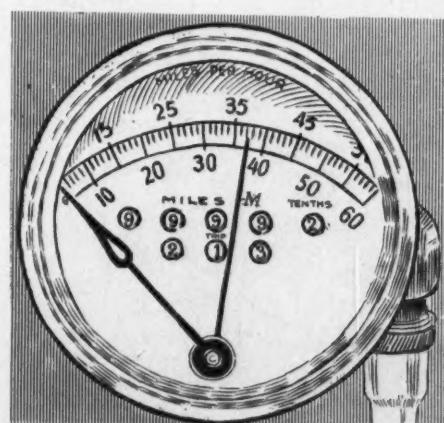
American Thermos Bottle Co.—A new exhibitor is the American Thermos Bottle Co., which exhibits a large assortment of thermos bottles of various sizes. A new feature is the thermos jar with which provisions can be kept cold or hot for 12 hours. With the thermos bottle liquids can be kept hot 24 hours. This firm will also exhibit an assortment of baskets and leather cases with a capacity of from one to six for the convenience of carrying thermos bottles.

John G. Wilkinson Co.—A fine display of winter covering for the motorist is to be seen at the exhibit of the John G. Wilkinson Co. This includes fur coats and fur-lined coats, robes and gloves.

C. Cowles & Co.—This concern specializes on motor car body fittings, equipments and trimmings, including its Security locking handle, curtain fasteners, bouquet holders, dome lights, cigar lighters, speaking tubes, toilet cases, electric side lamps, curtain rollers, microscopes, foot rests, corner lights, enunciators, and numerous other trimmings.



EVER READY UNIVERSAL



STEWART MODEL 4 INSTRUMENT

Miscellaneous Accessories

NO CHANGES are noted in the Nightingale whistle, which is handled by the Comptoir d'Innovations Pour Automobiles. This device is operated from the exhaust direct, or from an air tank by means of a hand pull, lever or pedal. It has chromatic scale notes with a continuous trill, and can be used on motor boats as well as cars.

Garage Equipment Co.—Malleable instead of cast iron is used in the construction of the Hux combination muffler and chime valve, Fig. 5. There is a direct passage of the exhaust either to the horn or the cut-out. While the latter is being used the horn generally is closed. The cut-out and horn valve are independent and both can be used separately, which does away with the necessity of having two valves.

Automobile Supply and Mfg. Co.—One of the things that the Automobile Supply and Mfg. Co. will uncover at the palace will be a horn, Fig. 3, of novel shape, a far reaching and penetrating tone. In shape it is somewhat on the order of an interrogation mark with a perforated ball for its mouth. This will be the only one of the many horns that this concern will display.

Gabriel Horn Mfg. Co.—Improvements over old models will be noted in the Gabriel product at the show, the feature of which is the valve that operates this exhaust horn. This valve is designed to

prevent sticking, for as soon as the valve A in the main channel begins to close the disk B in the branch channel placed at an angle of 90 degrees starts to open, it permits the exhaust to immediately escape, whereupon the horn responds and prevents the building up of back pressure. A cut-out is had by removing the circular disk A in the main channel which gives an escape of $1\frac{1}{4}$ inches and relieves the back pressure caused by the muffler.

Sireno Co.—The Sireno is an electric siren with all rotating parts equipped with adjustable ball bearings. There is a field magnet cast of one piece of special metal; the coils are form wound, the armature is of the iron-clad drum type built up with steel laminations; the commutator is of hard-drawn copper insulated with sheet mica, while the turbine is of cast aluminum alloy, machined and keyed to an electric motor shaft. Operating the Sireno is by the pressure of a button on the steering wheel on the floor at the side of the car or wherever the owner may wish to place it. The electric current may be had from the car's storage battery which will not interfere with the battery doing its duty otherwise. The Sireno operates nominally from 6 to 8 volts, but a louder tone and greater carrying power may be had by increasing the voltage. The principle involved is that of air currents generated by the rapidly revolving turbine which is driven by the electric motor, the air is drawn through the funnel of the siren, and forced out through the peripheral openings on the principle of centrifugal force.

J. S. Bretz—The Hartford type C universal joint, distributed through the J. S. Bretz Co., is an all-steel, dust-proof, self-lubricating joint, Fig. 3, consisting of two yoke ends T, each end with a cross cylindrical bearing portion, which fits into the central cross C of the joint. The type A joint is of the ball and socket style.

Isaac G. Johnson & Co.—An exhibit of particular interest to engineers and designers will be that of Isaac C. Johnson & Co. Here will be seen specimens of castings from various steels and alloys. Of these the nickel steel castings are specially suitable for use in motor car construction, by reason of its great tensile strength which shows a test of over 87,000 pounds per square inch. Its very high elastic limit indicates that it can be subjected to very severe strains and shocks before it will begin to bend or give way and the high percentage of elongation and reduction of area shows that it will not break under very severe conditions. From this metal can be secured a casting of great strength for light weight, which can

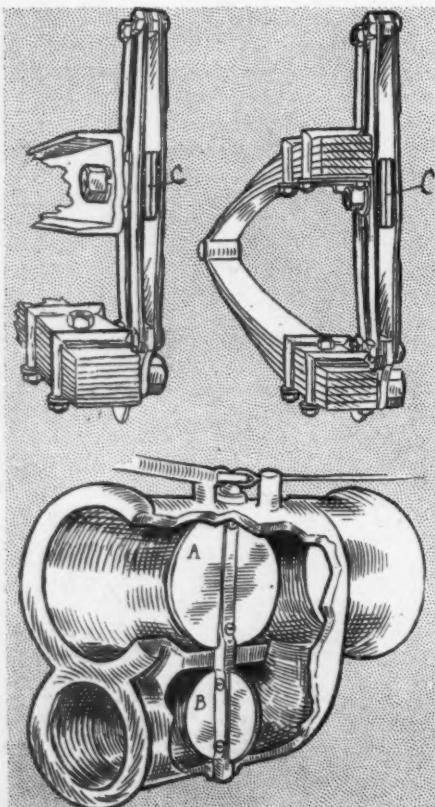


FIG. 1—GABRIEL ABSORBER AND VALVE

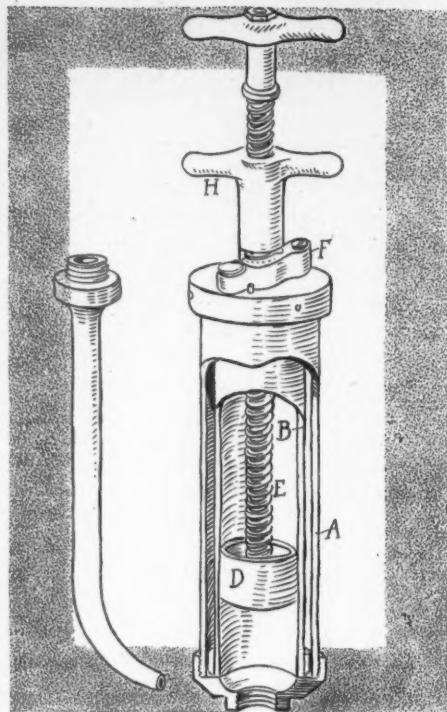


FIG. 2—THE RUBLY OIL GUN

be case hardened and welded without difficulty. This exhibit also will show chrome nickel steel castings for gear blanks, having a tensile strength of 104,000 pounds. Another metal is styled Monel metal, which contains from 60 to 70 per cent nickel, alloyed with copper. This is a non-corrosive metal, having a tensile strength of from 65,000 to 85,000 pounds per square inch. A special grade of metal, which has a high percentage of graphitic carbon, which is of unusual density and which is much more elastic than cast iron, is recommended by this firm for piston rings.

Austro-American Separator Co.—No Shammy is the name given by the Austro-American company to its gasoline and water funnels, which are to be displayed. As its name indicates, this funnel may be used without chamois, it being claimed that this device, P, Fig. 6, separates all water and dirt from the gasoline and prevents it from going into the tank. This is accomplished by means of a double separating

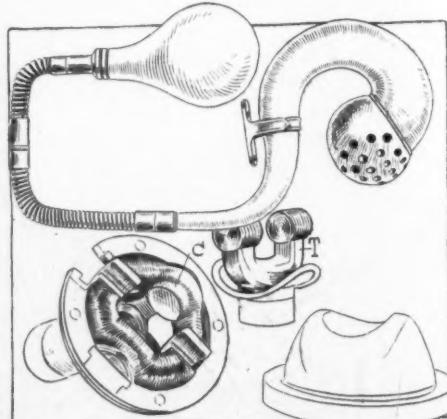


FIG. 3—HARTFORD JOINT AND AUTOMOBILE SUPPLY & MFG. HORN

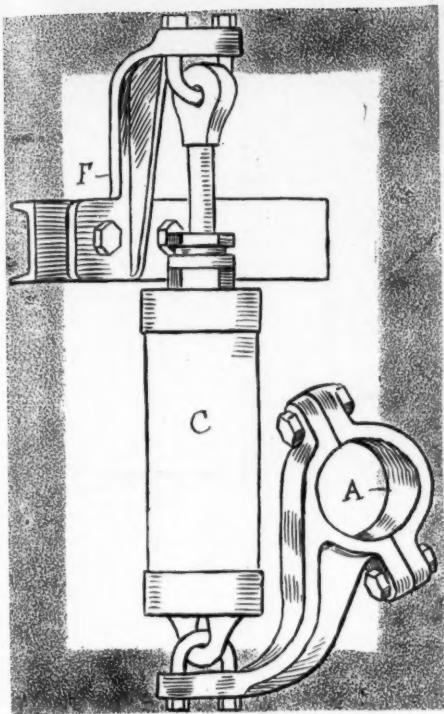


FIG. 4—FLENTJE'S SHOCK ABSORBER

process. The automatic separator is installed in the gasoline line under the footboard of the car between the tank and the carburetor, and it is said that even if the tank is full of water not a drop can reach the carburetor.

Rubly Mfg. Co.—A most unique and cleanly combination grease and oil gun will be on display at the exhibit of the Rubly Mfg. Co. This consists of a syringe cylinder B, Fig. 2, open at one end, fitting into another case A which has the regulation spout. The advantage of this is that in filling with grease the part B is removed from case A, pushed into the grease and filled, and when replaced in case for use the outside is perfectly clean for handling. A nut section latch F on the top may be used when needed for grease, and when oil is used the latch can be removed and the plunger worked freely up and down. When grease is used the plunger D is slowly lowered by turning the stem E which is threaded and in mesh

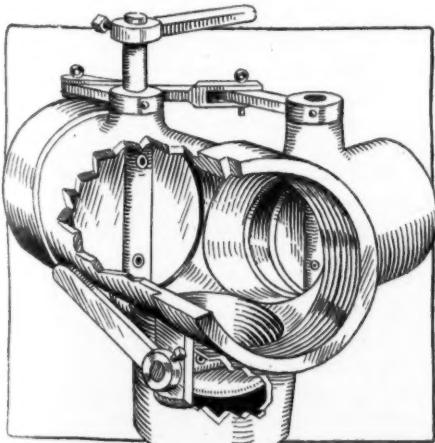
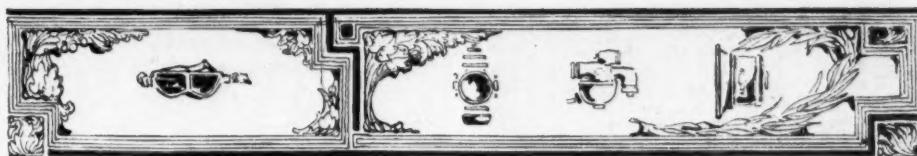


FIG. 5—HUX EXHAUST VALVE



with the latch F. When oil is used the latch F is out, as the plunger is pulled up and down direct.

McCord & Co.—Prominent on the stand of McCord & Co. will be a recently developed device styled class O lubricator which is designed to give constant sight feeds on the dash without the necessity of the oiler itself being located there or the alternative of two lines of piping for each sight feed up to the dash and back to the lubricator. This design attaches to the engine side of the dash with the sight feed projecting through. It is driven by a vertical shaft connecting with the camshaft of the engine, which method of driving, however, can be varied to suit different requirements. Originally the company had intended to get this oiler to draw its supply from an auxiliary tank by means of the combined suction stroke of the small plungers. Experiments, however, demonstrated that this proposition was too delicate for general use, so the design was changed somewhat and in the lubricator shown a large master pump draws the oil from the auxiliary tank, maintaining a constant level in the lubricator and supplying the small pumps.

Ernest Flentje—The Flentje glycerine hydraulic jounce and recoil preventer is of the dash pot type, wherein the resistance offered to the recoil of the spring is had by a cylinder containing glycerine within which operates the piston. This piston rod is connected by a universal joint connection with an arm on the chassis, while the bottom end of the cylinder is connected by the same means to the axle. In the piston are the ports through which the glycerine passes within the cylinder. There are two sets of these ports, one of which is larger than the other and which is controlled by a valve, while the smaller ones are opened continuously. As the piston is forced downwardly in the cylinder, the glycerine is forced up through both of the continuously opened ports, the valve lifting to permit of the liquid to pass through. When the springs begin to recoil, the upward movement of the piston causes the valves to close the ports and the piston can then move upwardly only as fast as the liquid can go through the ports, the valve being a comparatively small opening movement, is closed the instant the piston begins its upward movement. This making the recoil of the springs slow and moderate and without any bouncing action.

J. H. Sager Co.—The line of equalizing springs manufactured by the Sager company will be displayed, the maker being content to go to the show standing pat on his 1908 product. In action these springs

work very freely within a certain limit, or where the circle of the spring is largest. They multiply in stiffness very rapidly, however, and check the down thrust and rebound of the body.

Gabriel Horn Mfg. Co.—In addition to horns, the Gabriel company is planning to display its shock absorber, Fig. 1, which has been improved over the 1908 idea. The idea in the Gabriel absorber is to retard the extreme downward and upward action of the springs by applying and gradually increasing the friction in proportion to the severity of the shock and to exert sufficient existing force to overcome the sudden reverse motion. A steel block and two steel washers bolted together separate the steel side plates at their ends. There are two steel plates riveted firmly together and a recess to hold a thermoid liner pad between the side plates. In addition there is a friction material, the friction pad being thicker than the space between the side plates at their ends, which causes the friction to gradually increase as the pad approaches the absorber. Because of the flexibility of the side plates the friction pad moves easily when near the center of the absorber, this idea being to retain the resiliency of the springs.

Timken Roller Bearing Axle Co.—The Timken Roller Bearing Axle Co. is intro-

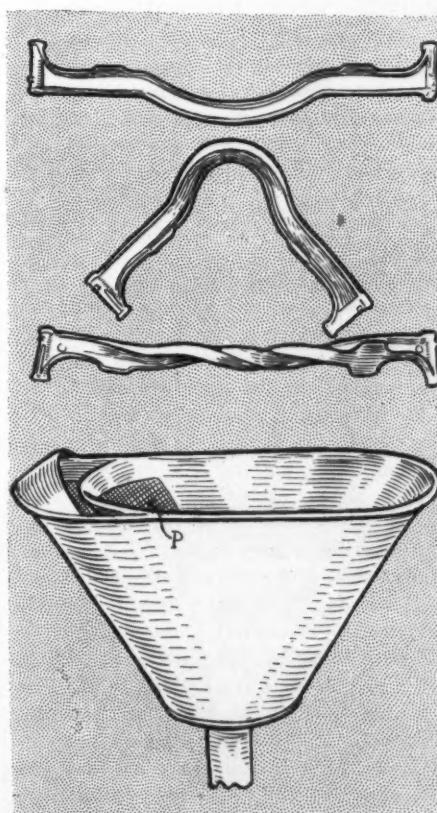


FIG. 6—AUSTRO FUNNEL AND JOHNSON AXLE



FIG. 7—BROWN VALVE GRINDER

ducing its new back axle, which is of the floating construction and consists of a one-piece steel casing extending from one rear wheel to the other and with a central expansion for containing the differential. It is without a truss rod. All adjustments for the bearings can be accomplished from the outside of the case. The steel casing gradually increases in strength towards the center and sudden variations in thickness are avoided. Internal and external brakes are fitted, the spring seatings are swiveled, and a swiveled V torsion rod is used which spans the differential.

Standard Roller Bearing Co.—The Standard Roller Bearing Co. continues its line of front and rear axles, the rear ones being of two types, one of the straight floating construction of the design used on Chalmers-Detroit cars and the other the combined rear axle and gearset as used on Pennsylvania and Thomas cars. In the transmission axle the gearset is mounted in the same housing that carries the differential.

Merchant & Evans Co.—The Merchant & Evans Co. continues its rear axle of this season, with which is incorporated a three-speed gearset with direct drive on both high speeds. In this axle are two bevels on the differential constantly in mesh with the two pinions on the gearset mainshaft, between which pinions is a clutch for anchoring either pinion to the mainshaft. This company also has a rear axle gearset in connection with a solid forged stationary axle which is centrally dropped, forming a bed into which the housing for the gearset and differential is anchored.

Charles E. Miller—Improvement only in design and finish will be noted in the line of Brampton chains that will be shown by Charles E. Miller. The English makers, who have been in the chain business for 56 years, are well satisfied with their products as it is. The Brampton chain as it is made for the motor car trade has

a stationary bushing and large spun rivet. All the side plates are chamfered and all parts are polished to revolve without friction on properly cut sprockets.

Whitney Mfg. Co.—The Whitney roller chains for 1909 are similar in general construction to those which the Whitney company has been making for some years except that it is claimed they have nearly double the strength of the earlier models as a result of special materials and deeper links. In the various pitch sizes the Whitney company is making its chain considerably wider than it used to in order to secure an increased bearing surface on the rivets and sprocket teeth. The company asserts that its 1-inch-pitch chain for 1909 is stronger than the 1½-inch pitch chain of the past. Because of the short pitch now used it is claimed the drives are quieter in operation.

Diamond Chain and Mfg. Co.—To outward appearance the chain of today is the chain of last year, but a talk with a representative of the Diamond Chain and Mfg. Co. will soon dispel any illusion on the subject. The chains of today are made from chrome nickel steel, subjected to heat treatment and are thereby made of greater tensile strength and much lighter. In this exhibit will be seen all manner of chains, from bicycle chains of low tensile strength, to truck chains with a tensile strength of 3,500 pounds. The heat treatment, besides increasing the tensile strength, also adds to wear resisting qualities.

United States McAdamite Metal Co.—McAdamite is a new alloy for which great strength and lightness is claimed. Its specific gravity is 320 and its melting point is 320° Fahrenheit, and it is designed to take the place of bronze and brass. Among the claims made for it is that it has from two to four times the strength in any direction, three times the volume, or one-third the weight of bronze and brass. This metal will be shown by the United States McAdamite Metal Co. One of the features of the exhibit will

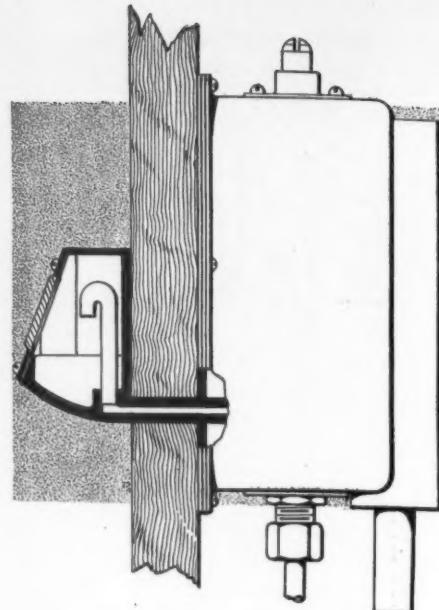


FIG. 9—MC CORD OILER

be a McAdamite connecting rod which has been used on engines, running from the smallest up to as high as 100 horsepower.

Cramp & Sons—Among the many things that will be shown by the William Cramp & Sons Ship and Engine Bldg. Co. will be

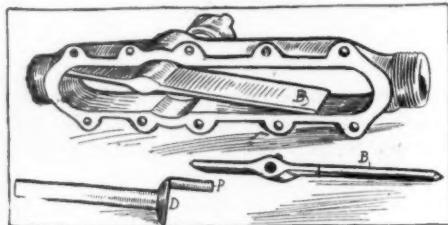


FIG. 10—PADDLE WATER PUMP

parsons manganese bronze, front axle castings, steering gear castings, housings, brake bands, engine frames, lamp brackets, differential gear cases, transmission gear cases, levers and parsons white brass bearing castings.

Standard Welding Co.—Welding by electricity will be demonstrated by the Standard company, which will show what its process can do for the motor car manufacturer. It will exhibit such parts as crankshafts, front spring hangers, connecting rods, steering knuckles, brakes, etc. This company has a tubular steel bottle made by its process which has been tested to 400 pounds internal water pressure.

Shelby Steel Tube Co.—The usual line of Shelby steel tubing designed for use in motor cars is promised by the Shelby company.

Paul S. Reeves & Son—That a concern which can cast a 9,000-pound casting for the United States navy will look after casting small parts such as crank and gear cases, tire holders, levers and bushings, shows the diversity of its operations. At the exhibit of Paul S. Reeves & Son this will be seen. Their special metal is tubal

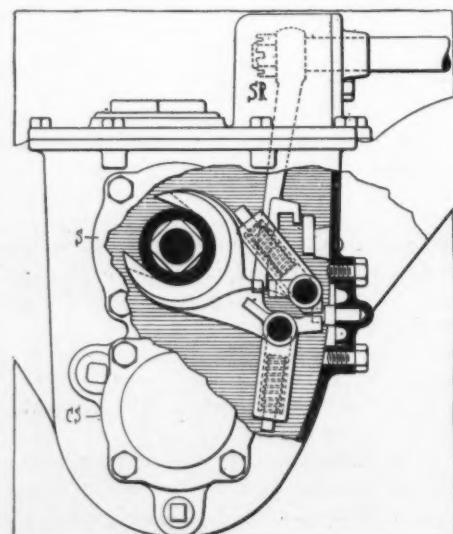


FIG. 8—BROWN-LIFE NEW GEARSET

manganese bronze, such as is used by the United States government for torpedo tubes, gun mounts and sights, and various accessories where great strength is required. This company also manufactures fourteen different grades of babbitts, and will duplicate any special alloys to order.

Warner Gear Co.—This company has three new things in the transmission line for next year. One is an improvement in its No. 82 gearset by which it can be mounted on tubular frame members as illustrated in Fig. 13, the case-supporting arms having semicircular recesses by means of which, in connection with similarly shaped caps, accommodation is provided to the tubular frame pieces T. This same illustration shows the company's new style of selective gearset mounted on the forward end of the tube inclosing the propellershaft and so doing away with sub or cross frame pieces. The forward end of the gearset carries part S which is carried in a socket in a cross member of the frame. In the forward part of the gearbox is a compartment C for the multiple disk clutch and back of it is the regular gearset compartment. In the rear of this comes a tubular neck piece T which is the forward end of the tube inclosing the propellershaft. There is not a universal joint in the propellershaft and the only universal

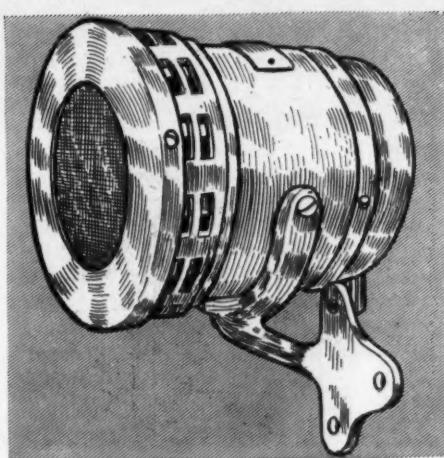


FIG. 12—SIRENO SIGNAL

end plates which carry the bearings. The gear shifter rod SR enters the top of the case and is entirely inclosed by a small cap covering. Both sets of sliding gears are on the mainshaft.

American Ball Bearing Co.—The exhibit of the American Ball Bearing Co. will include tubular and I-beam front axles carrying hubs fitted with the company's two-point ball bearings and imported annular ball bearings. The line of live rear axles will be fitted with two-point ball bearings, annular ball bearings and Hyatt roller bearings. An important product is the rear axles with sheet steel jackets in which the differential housing is drawn from sheet metal, as are the driveshaft housings. The company also has a novel steel jacketed rear axle with planetary gearset in which the automatic clutches run in oil.

John A. Salman & Co.—This concern will exhibit goods of its own manufacture, consisting of monograms for motor cars, monogram belt buckles, and monograms for bags and fobs. These are in gold plate, silver, and solid gold.

I. J. Smith Mfg. Co., Inc.—In its line of washers for motor car garages, this company will feature for 1909 its No. 3 indestructible washer, the latest improvement in its line. This washer, built principally of brass, attaches to the ceiling of the garage and consists of a long horizontal water pipe carried a foot from the ceiling to one end of which the hose attaches, the weight being carried on the

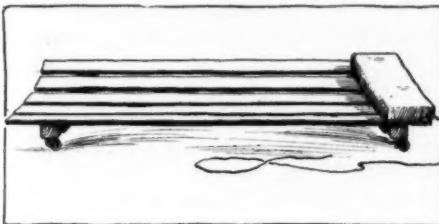


FIG. 11—BROWN CREEPER

in the system is within the ball-support at the forward end. The third feature is the regular selective gearset with the multiple disk clutch carried in a forward compartment and the gearbox designed to be carried on frame members.

Brown-Lipe Gear Co.—Of the four different models of sliding gear transmissions that the Brown-Lipe Gear Co. will exhibit, only one is a new 1909 model. This has been styled model 35 and as shown in Fig. 8 is of that style with the main-shaft S above the countershaft CS and with the case in one piece and provided with

opposite end. To wash the car the hose is pulled down, at the same time drawing down a revolving tube of the washer, simultaneously with which the valve in the center of the washer is operated, allowing the water to start running. The supporting arm is held in any position by a catch so that the party washing is only to hold the hose. The revolving arm is of sufficient length to allow the workmen to get completely around the car.

Motor Accessories Co.—The concern will exhibit the new ball bearing M. & S. inductor type of alternating current magneto manufactured by the Navity-Sleeper Co. The magneto is driven from the flywheel by friction pulley or belt, and simply generates alternating currents, not having a breaker box or distributor in conjunction with it. In addition to this at this booth are the Wayne portable gasoline tank and pump, and the Williams brass wind shield.

Brown Co.—The motorist who takes care of his own machine will be greatly attracted to the Auto-Creeper, Fig. 11, at the exhibit of the Brown Co. It will appeal directly to the man who has occasion to lie down under his car and work. This device consists of rack-shaped carriage on castors with a leather-covered head rest. It obviates the use of cushions, keeps the clothes off a greasy, dirty floor, and with the head rest affords a comfortable position. Another very convenient tool seen here is a valve-grinding set, Fig. 7, consisting of the valve-grinder proper, a valve-lifter and an abrasive grinding material. This grinder, the subject of a sketch, gives the correct back and forth rotary motion, without the need of much operating space. The lifter raises the valve when necessary to turn it to charge abrasive material. The Brown Co. also shows a most convenient and compact spark-plug wrench, a tire pressure indicator, which can be attached quickly to any valve stem and will show instantly the exact pressure in the tire. The Brown compressometer for insertion in the spark plug hole of cylinders, shows the exact compression of each cylinder, enabling the motorist to detect a leaky cylinder promptly. This device is equipped with a maximum hand, to avoid the necessity of close observation while cranking a motor.

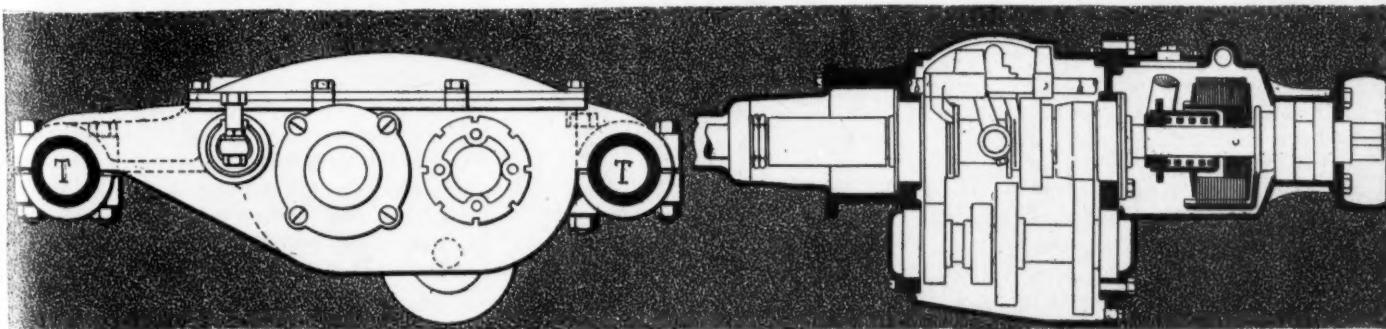
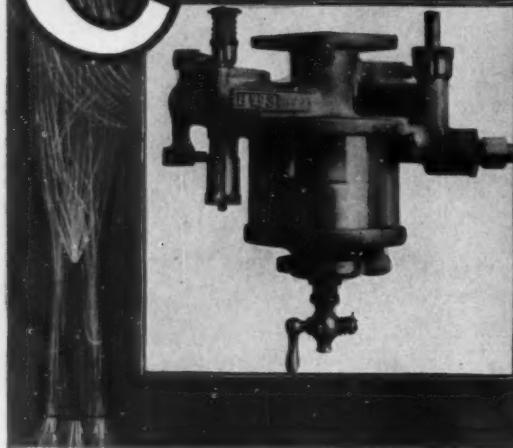
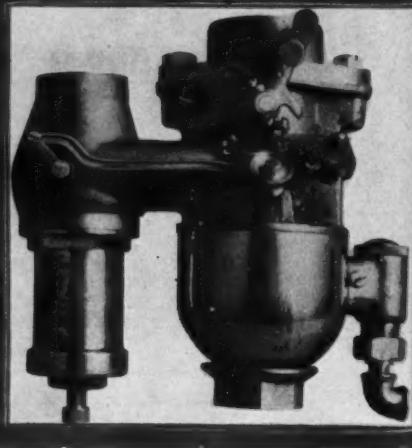


FIG. 13—TWO NOVELTIES IN WARNER GEARSETS AS EXHIBITED

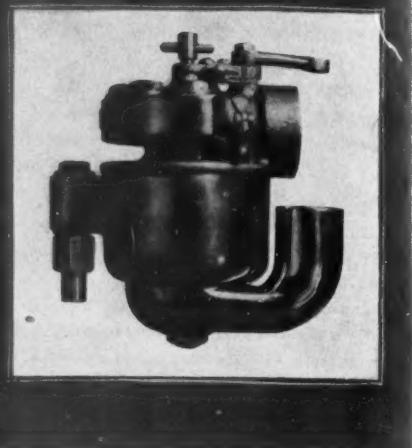
Carbureters and Their Principles



STROMBERG



SCHEBLER



KINGSTON

EVERY carbureter maker has made improvements during the year, not one of them being content to say, "My carbureter is all right this year and I am not making any changes for 1909." All of them are working on the scheme for controlling the flow of gasoline in proportion to the air demand, some attempting this directly by raising the gasoline needle valve with the increased demands of the motor, such as in the Schebler and Breeze carbureters; and others accomplishing this indirectly through various air regulations and auxiliary valves as in the Kingston, Stromberg, Bowers, as well as those used by car makers.

Wheeler & Schebler—In the new Schebler, Fig. 5, the needle valve N is raised with every opening of the auxiliary air valve X; the more the valve opening the more gasoline is admitted. The auxiliary valve is controlled by a dash pot D instead of by a spring, this dash pot operating in the usual manner with a ball check in the piston. The valve X controls the needle valve N as follows: When the valve X lowers to admit air, as indicated by arrows A1, the lever L, due to its connection with

the valve X, as indicated by dotted lines, is moved to the left. The end of this lever has a T-head and carries a small roller in each arm of the T. One roller bears upon the spring S, the other on the rod R. This rod is carried in an arm B on a hub part to which is carried the needle valve N. As the arm L moves leftwards, its movement is determined by the spring S, which in the illustration is bowed outward in the center, and consequently thrusts the rod R away from it, which tilts the lever B to the right and at the same time lifting the needle N. The contour of the adjusting spring S is determined at two screws, 1 and 2, the first one being a low speed adjusting screw which can be turned to bow the front end of the spring out, or leave it straight if necessary. The high-speed adjusting screw 2 performs similar functions, and by changing these adjusting screws the amount of gasoline fed at different speeds can be regulated. The point of the needle valve is, as heretofore, rotated in a vertical channel through which the main air supply A enters.

Breeze Carbureter Co.—In Fig. 6 the needle valve N is raised and lowered in

harmony with the rotating of the throttle T. This is accomplished by a roller R on the needle valve, which contacts with a track S, which track has ball endings eccentrically carried at one end in the high-speed adjusting button HS and at the opposite end in the low-speed adjusting button LS. Each of these buttons has graduations marked so that the greatest delicacy can be achieved in setting it for the required supply, and each is held in position by a strong flat spring. With the throttle almost closed, the roller R rests on the track near the low-speed adjusting button, and by slowly turning this button the throttle and needle valve are raised or lowered until the proper adjustments for low speed are obtained. On opening the throttle the roller runs towards the other end of the track near the high-speed adjusting button, which can be adjusted for high speeds, and after which adjustment the various changes of the throttle simply run the roller R from one correct adjustment to the other. This carbureter uses a fixed main air supply A and auxiliary air enters through the passages X. This ends the attempts at direct gasoline control through the needle valve.

Stromberg Motor Devices Co.—In the carbureters with indirect gasoline control, that is, by means of auxiliary air valves, considerable novelty hinges on the new Stromberg, which is of the concentric float type and has a particularly novel method of raising and lowering the float level. This carbureter uses the spring control air valve, Fig. 3, which is controlled by two springs, a high-speed spring S and a low-speed spring S1, so that when the auxiliary valve X opens it first compresses the spring S1, which is the weaker of the two, and, after it is opened to a determined position, compresses the spring S in addition to this. Special Stromberg adjusting nuts are furnished for both of these springs, both of which nuts are of the self-locking type. The manner of

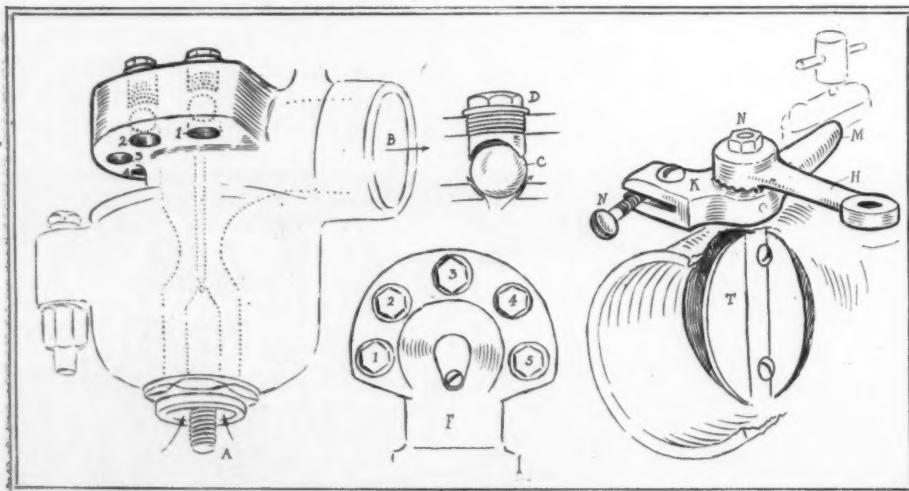


FIG. 1—KINGSTON BALL AIR VALVES

FIG. 2—KINGSTON THROTTLE HANDLE DESIGN

raising and lowering the float appears in Fig. 4, in which the float F has riveted to its top a pair of metal straps S, which hinge at their upper ends to the yoke-arms of the lever L. This lever is fulcrumed at the point H, and the short arm supports the needle valve N, with its spring NS, resting against a collar at the lower end and an adjusting nut AN, com presses the spring NS, the tension of which tends to force down on the short arm of the lever L and also to raise the float F. The stronger the tension of the spring NS, the easier it will be to raise the float F and consequently the lower level of the gasoline in the nozzle which is located within the center of the float. Removing the tension of the spring NS lessens the pressure on the short arm of the lever L and so more gasoline is required to raise the float F, which means that the gasoline will be higher in the spraying nozzle and more of it will feed to the motor. Although changing the design of the carbureter in this needle valve adjustment and using the concentric float as well as discontinuing the waterjacket for air-cooled cars, the company still continues to use the glass walls for the float chamber and to do without a needle valve in the spraying nozzle.

F. E. Bowers Co.—Here is introduced a novel auxiliary air valve in a carbureter, which is shown in Fig. 7 to be a metal disk D, in which are three circular air openings X, each guarded by a flat metal strip S attached at one end and covering the air opening at the other. Each piece S is of varying spring tension so that when sufficient air cannot enter through the main channel A, first one, then a second, and

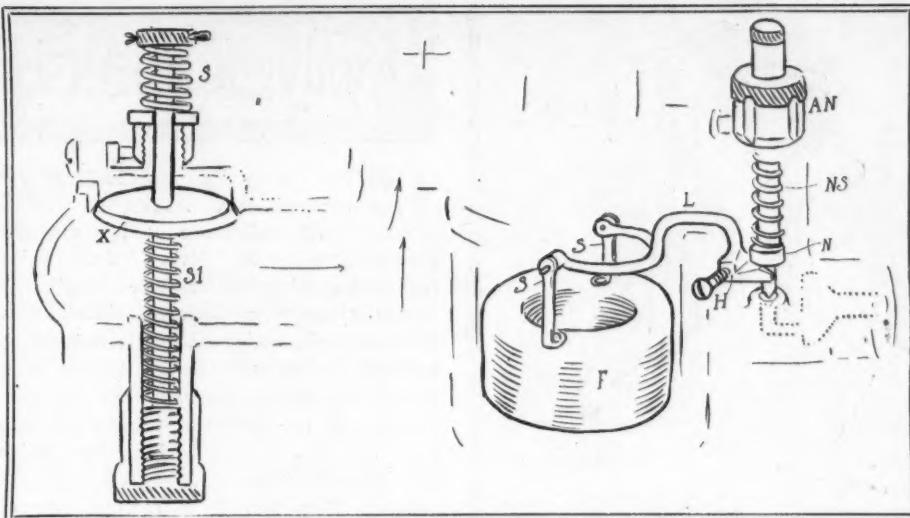


FIG. 3—STROMBERG AIR VALVE

finally a third of the auxiliary openings X are brought into use. The air for these openings entering the carbureter through openings X1 and not by way of the main entrance past the nozzle N. All of the air from the main entrance passes the central opening in the disk D, while the auxiliary must pass through the openings X.

Hietger Carbureter—This idea uses a central vertical air opening past the nozzle and a spring control horizontal air opening, which is in direct line with the throttle exit at the opposite side of the carbureter. The air passages thus forming a T, with the main entrance the vertical, and the auxiliary air opening and the throttle in the arms.

Kokomo Electric Co.—Kingston introduces the ball auxiliary air valve, Fig. 1, in which A is the main air

FIG. 4—STROMBERG FLOAT ADJUSTMENT

entrance, B the exit to the motor, and 1, 2, 3, 4, ball-controlled auxiliary air entrances, one of which is illustrated at C, in which the ball rests in a beveled seating and is held in position by a threaded cap D with a lower forked end embracing the top portion of the ball C, but allowing sufficient room for the ball to be raised by the demands of the motor. The relative position of the five balls is illustrated at F, 1, 2, 3, 4, 5, marking the tops of the caps holding each in position. All of these balls are of the same diameter and weight. This carbureter is made with a needle valve adjustable from the top. Fig. 2 illustrates the adjustable nature of the throttle control lever H, which attaches to a piece K pinned to the stem of the throttle T, through the serrated lower face of its hub part, and by loosening the

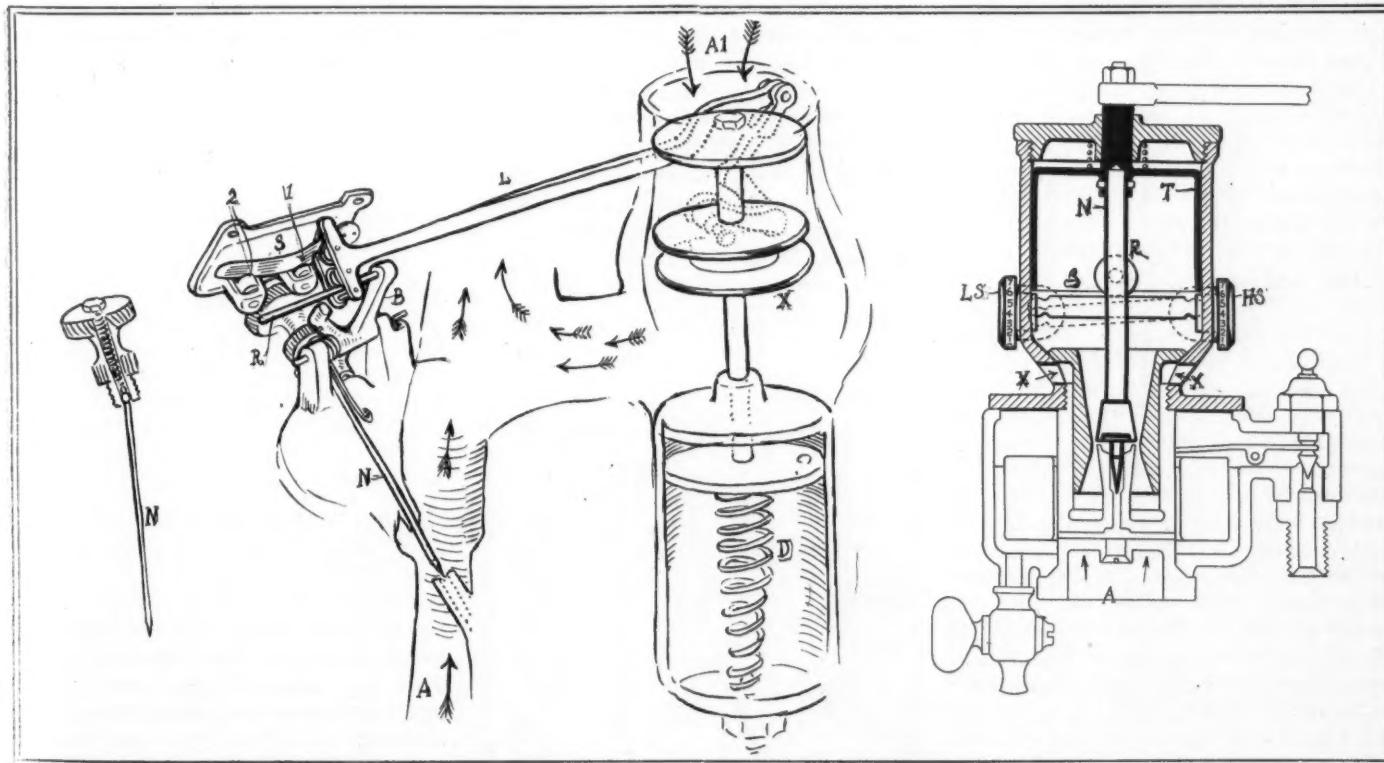


FIG. 5—GASOLINE CONTROL IN SCHEBLER CARBURETER

FIG. 6—GASOLINE CONTROL IN BREEZE CARBURETER

Body and Chassis

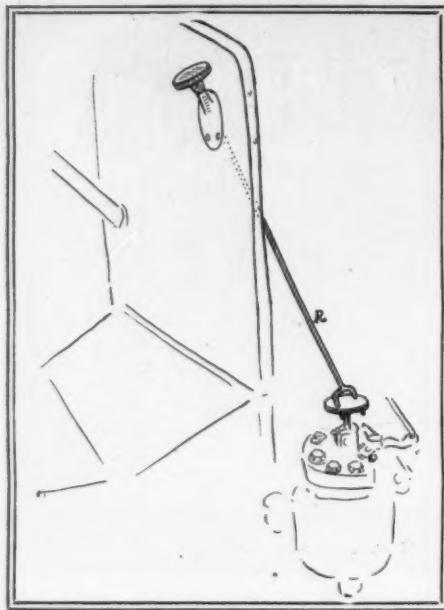


FIG. 9—FORD ADJUSTMENT

nut N the handle H can be set at any desired angle, with reference to the throttle disk T so as to suit motor requirements. A stop piece M prevents the opening of the throttle beyond its full position and the adjustable nut N can be set to determine the minimum closed position.

Mora Control—On the Mora the control of the main air opening A is from the dash of the car, Fig. 8 showing a lever L working on a semi-circular rack with connections to a ring piece R, circling the carburetor above the chamber and having a series of oblong slots A through which the main air enters. By partly rotating the ring, these slots can be made to coincide with others in the walls of the carburetor, thus regulating the air supply. The auxiliary valve X is a spring-controlled member.

Ford Idea—On the Ford cars, fitted with a new type of Kingston carburetors, a control of the gasoline needle valve is effected by a rod R, Fig. 9, with forked lower end entering the large adjusting nut on the top of the needle valve stem, the upper end of the rod passing through the dash and having a finger wheel for adjustment purposes.

Other Makers—Many makers of carburetors using a stock-made carburetor are not content with accepting it and putting it on the car without one fixing or another being used in conjunction with it. One example of this is the Stoddard-Dayton cars, which fit an air valve in the intake pipe just above the carburetor and which valve can be opened on high motor speeds to admit additional air. The value of taking air through an opening of this nature is that the suction on the gasoline around the spraying nozzle is reduced and the danger of securing too rich a mixture is eliminated. Where valves of this nature are used the invariable custom is to control them by a pull button on the dash. The difficulty of starting in cold weather has resulted in the fitting of many of the intake openings with a shutter valve.

THE Elite Mfg. Co. manufactures five or six different models of lifting jacks, all of which are of the nut and thread type, the lifting staff being threaded throughout its entire length. It passes through a beveled pinion with threaded hub, which pinion is rotated by another pinion on the horizontal shaft which the handle operates. In the compound jack the operating handle connects with two bevels for working the pinion which elevates the vertical staff.

Oliver Mfg. Co.—The Peerless jacks of this concern have the elevating standard with opposite tooth racks, so that the raising and lowering is by a combination pawl system, working first on one tooth rack and then on the other. The jack is elevated by working the handle below the level and lowered by working it above the level. These jacks are made from malleable iron castings.

William M. Briggs—This exhibit will contain the XX Century jacks manufactured by Joyce-Cridland Co. The elevating portion has a tooth rack on one side only, the elevating or lowering being by a double pawl arrangement operating in this rack. On the side of the housing contained pawl is a reversing lever to cause the jack to elevate or lower with the same handle movement.

Buda Foundry and Mfg. Co.—This concern has two lines of jacks, one for small cars and the other for larger ones. Both are of the pawl type and the lifting standard has a toothed rack on one side. The reversing lever for raising or lowering is adjacent to the handle. These jacks have malleable iron frames, steel elevating standards and a swivel top.

F. A. Brownell Motor Co.—The latest motor outfit built by this concern are the six-cylinder power plant with flywheel at the front end and gearbox carried on the rear end of the crankcase; and an 18-

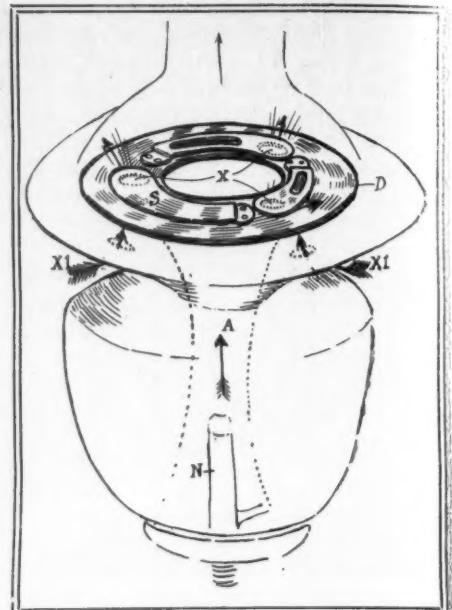


FIG. 7—BOWERS CARBURETER

horsepower four-cylinder motor coupled direct to a 5-kilowatt generating outfit; in addition to this the company handles its regular 18-horsepower four-cylinder motor. The six-cylinder motor, 25-horsepower, 3½-inch bore and 4-inch stroke, has the cylinders cast in pairs with valves in the head, operated from one camshaft carried in the right side of the crankcase. At the front end of the motor between the flywheel and the crankcase is a transverse shaft driving the water pump on one end and the ignition parts on the other. The timing gears at the forward end are enclosed in the crankcase proper. At the rear end the selective gearset is designed with the main shaft above the countershaft and the multiple-disk clutch is carried within the gearbox housing. The four-cylinder 18-horsepower motor is of similar design with same cylinder sizes.

Atwood-Castle Co.—The Atwood Mfg. Co. is to appear at the show as the Atwood-Castle company, and will exploit a full line of lamps and generators. Featured at the stand will be the new Atwood-Castle double drip generator, which is fitted with a valve which is designed to prevent the drip from becoming clogged or corroded. In the gas lamps will be found an easy method of removing and fastening the lens-mirrors without the use of screws or nuts on the outside of the lamps. There also will be new cylinder-shaped lamps for use on limousine and town cars.

George S. Sherman—The circle rotary light, made by George S. Sherman, automatically turns in the direction the car is going, which lights up a corner before the car rounds them. The light may be so adjusted to swing with the front wheels. There is an automatic catch that holds the light dead ahead except when the car turns a corner.

Gray & Davis—Working on the theory that their patrons are satisfied with regu-

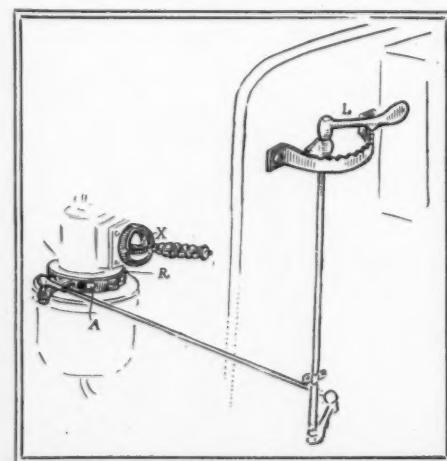


FIG. 8—MORA AIR INTAKE

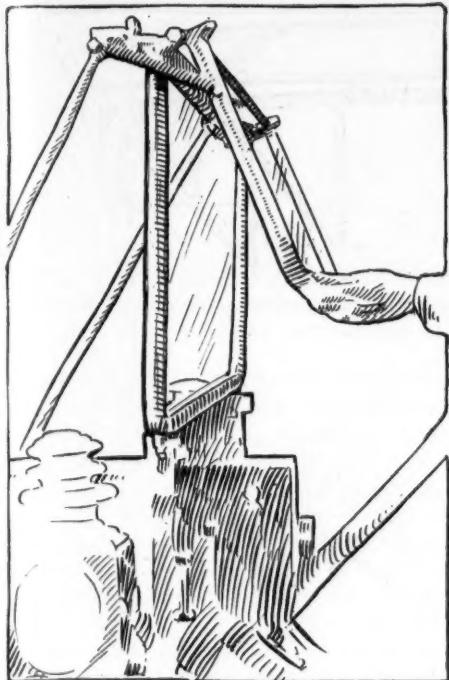


FIG. 1—MEZGER WIND SHIELD

lar styles, Gray & Davis have devoted their entire attention to perfecting the details of their line. Their only change from 1908 to the new style is a small tubular tail lamp which is made to sell at a very moderate price. Gray & Davis report that the demand, which was noticed at the beginning of the season, for black or gun metal finish for lamps has practically ceased except for close cars that are finished in dark colors.

C. T. Ham Mfg. Co.—Several new lamps will be found in the Ham company's 1909 line, all of them of the smaller sizes. The company also has changed the name of its square lamp from Rochester to Limousine, while the new ones are captioned Coupe, Meteor, Comet, Star, Mars and Venus. The Coupe is a square lamp with round corners, beveled lenses, while the Meteor, Comet and Star are similar to the Tourist, Corona and Reliance respectively, the only difference being that the bodies are smaller and they have a 5½-inch lens instead of 6¾. The Mars and Venus are tail lamps and differ from the Monitor and Venus in the handles only, the new ones having a bail over the top and a socket on the side.

C. J. Downing—On the stand of C. J. Downing will be shown a full line of Regal lamps.

John W. Brown Mfg. Co.—Oil side and tail lamps are to be shown by the Brown company, whose line takes in ten different models, three of which are of the tail lamp variety.

Badger Brass Mfg. Co.—Headlights, tail lamps and generators, in their 1909 style, will be shown by the Badger Brass Mfg. Co., a special feature of the exhibit being the solar eclipse headlight, which permits the driver of the car to cut out blinding rays of the headlights in the city streets.

Fittings and Parts

WINDSHIELD trend for 1909 is toward small brass frames, folding types, without a crossframe piece between the upper and lower halves of the glass where it obstructs the driver's vision, and upper halves capable of being set at any angle and of being replaced by a wire mesh screen for the catching of flies and insects in warm weather when the glass protection is not needed.

National Auto Top Co.—In the new folding shield of the National Auto Top Co. the upper half reverses and drops behind the lower half, requiring not more than 6 inches in the folding and not interfering with steering or other parts. The upper half is not hinged to the lower at their adjacent edges and is released from it by loosening a thumb nut at each end in a lug in the frame of the top half which fits in a slot in the lower half frame. When folded the thumb nut enters the same slot. Tightening it locks the upper half in place. The shield is made with mahogany frame, ¼-inch polished plate glass and solid brass attachments.

Sprague Umbrella Co.—Colonel Sprague, of the Sprague Umbrella Co., has ready a new No. 90 folding windshield, Fig. 2, which is in advance of previous ones of this type in that when folded the narrow central dividing strips are at the top and do not interfere with the vision. To do this the upper half is upside down when folded behind the lower half. The upper half folds through the usual brackets which are offset to miss the adjusting nuts. This shield is made with a solid brass molding for a

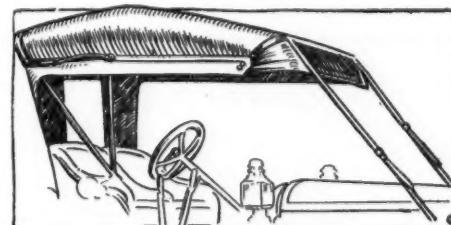


FIG. 3A—SPRAGUE'S TOP

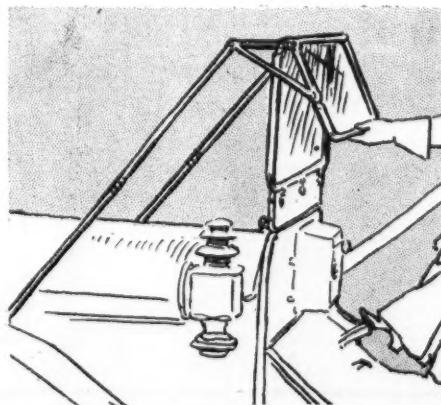


FIG. 3—RAND'S WIND SHIELD

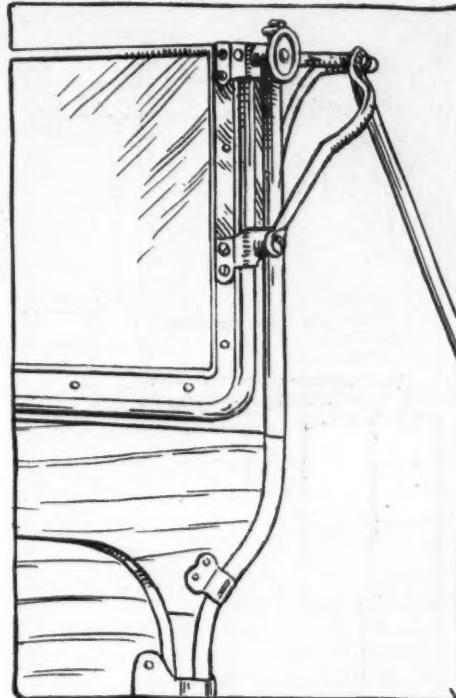


FIG. 2—SPRAGUE NO. 90 WIND SHIELD

frame. The No. 70 shield does not invert the top half when folding and so the heavy part of the frame is across where the center of the shield would be when up. The No. 42 shield with wood frame and hinged top half is continued.

Rands Mfg. Co.—The Rands Mfg. Co.'s line of shield is in wood and metal frames, the automatic brass frame No. 7, Fig. 3, being the latest. It is made without springs or thumb nuts and the top half can be lowered or raised with one hand. The No. 4 shield is for roadsters with the seat far back from the dash so that the lower half slants rearward instead of standing vertical. By this arrangement the upper half is 12 inches in rear of the vertical dash. The No. 6 shield is similarly designed, but is made of brass and is automatically operated like No. 7.

Brandenburg & Co.—Handling the Ross & Browne windshield, this concern will have the regular line of wood frame shields in which the top half hinges to the lower by single or double hinges and when folded down the thumb screws which anchor it also secure it to the lower half and so prevent rattling.

C. A. Mezger—The automatic shield C. A. Mezger has a brass framework Fig. 1 which folds backward the halves hinging together. It is held in its up or down position by spring tension and can be raised or lowered by one hand without stopping the car. A feature of it is the anti-rattle in which a piano felt strip is placed between the end of the glass and the brass frame and the frame instead of clamping against the glass bears upon doubled curved pieces which in turn bear upon the glass.

Troy Carriage and Sun Shade Co.—The No. 3 divided folding shield of the Troy

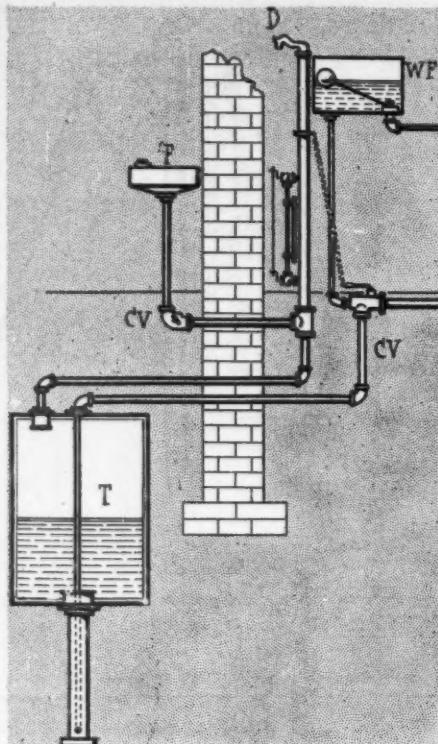


FIG. 4—S N E L L G A S O L I N E S Y S T E M

Carriage and Sun Shade Co., Fig. 9, has in brief two upper halves, one an insect screen A and the other a glass part B, each hinged at the center of its ends to a crossbeam which at its center hinges to the top of the framework of the bottom half of the shield so that when the insect screen is up the glass is down and vice versa. On the center of the end frame of the lower half are two curved hools for holding the insect screen or the upper glass alongside of the lower half as in part 3 of the illustration; or if desired as in part 1, the one part can be anchored up and the other left down. This concern

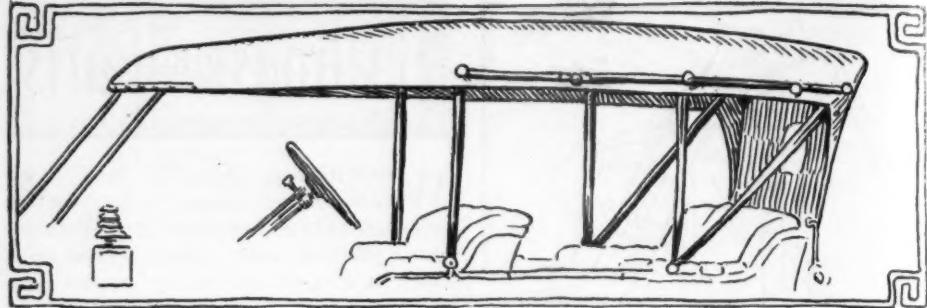


FIG. 5—NATIONAL TOP FOR ROADSTERS OR TOY TONNEAUS

has a rain vision attachment for its No. 2 shield which enables the driver to see ahead in rain storms. In addition are types of folding shields with brass and wood frames and folding from a hinge or long center arm.

Vanguard Mfg. Co.—The Vanguard Mfg. Co. has in its new shield folding toward the driver windshield another example of the shield free from the crossbar between the glass halves. The Vanguard as seen in Fig. 10 is a folding type, the upper half hinging by a long hinge bar R at each end to the lower half. Attached to the top of the lower half at each end is a bow-shaped piece with a slot B and another C. On the hinge rod R is a finger nut A whose stem, when the windshield is up, enters the upper slot B. With the top half folded beside the lower half enters the slot C. Once it is in either of these slots tightening the finger nut locks it firmly in place. The hinge rod R so attaches to the top part of the shield by the piece D as to allow the top part to lie close to the lower half when folded.

Hill Mfg. Co.—The Hill Mfg. Co. uses a brass tubing framework and has eliminated the cross center bar between the halves. The upper half of this windshield does not hinge to the lower half, but attaches to it

through a finger wheel C1 which enters the framework of the top half and rests in a slot in a socket piece E on the lower half of the shield. Tightening this screw at each end locks the upper half rigidly in place. In the illustration, Fig. 7, a similar finger nut C attached to the insect screen carries it also from the piece E. Should this screen be required its position can be changed with the glass top half. The brace rod B attaches to a $\frac{1}{16}$ -inch pin on the piece C, thus making this piece the main feature of the shield.

Sprague Umbrella Co.—Colonel Sprague comes to the show this year with a run-about top, Fig. 3A, labeled No. 36 and which is new in design. The front bow is completely out of the way of persons entering the car and is so constructed as to allow the front bow to slide down on the middle one, being held firmly in either position up or down. There are no cotter pins used and it has side and back curtains. In addition to this Colonel Sprague will have his usual line of tops.

National Auto Top Co.—New in the line of the National company will be a top, Fig. 5, designed for use on small touring cars and toy tonneau bodies, the feature of it being the elimination of the front bow, which permits of easy access to the front

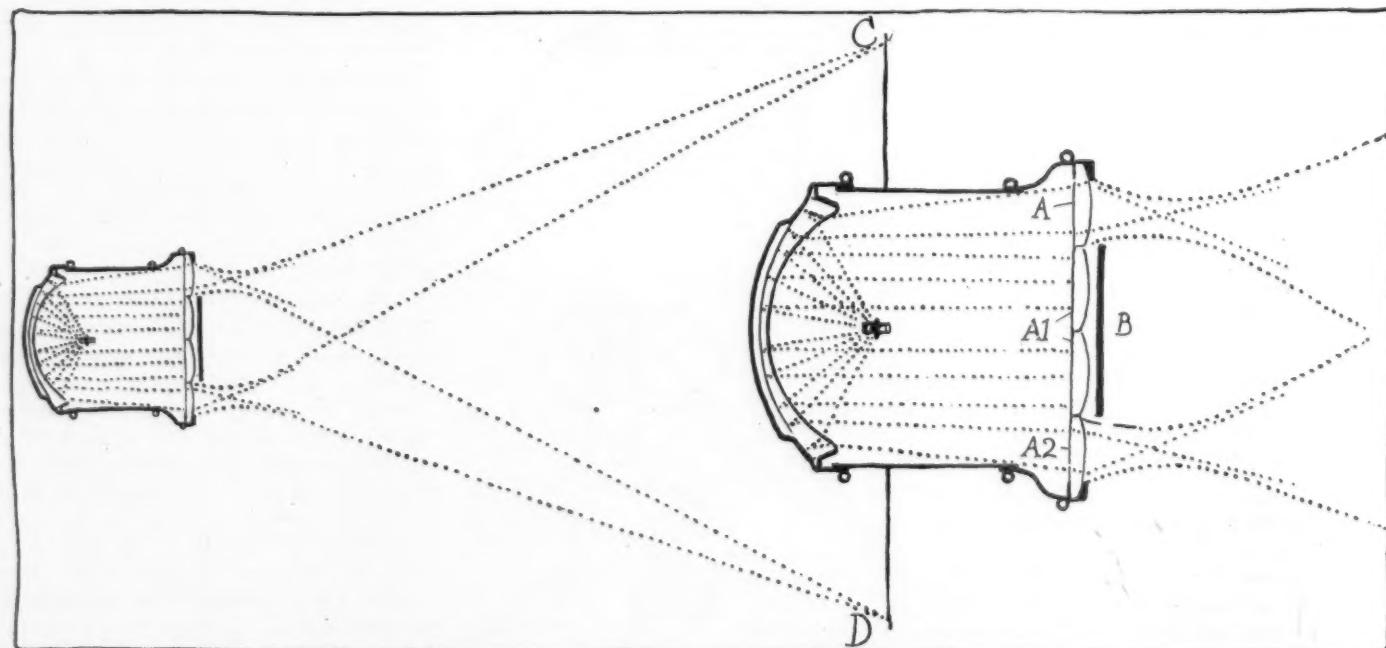


FIG. 6—NEW GLASS SYSTEM IN RUSHMORE HEADLIGHTS

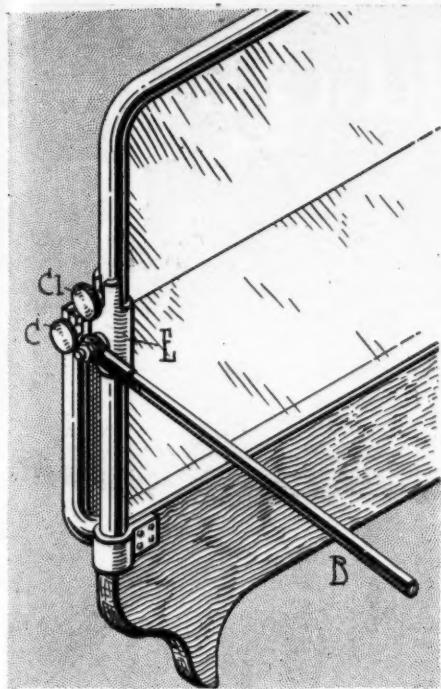


FIG. 7—HILL WIND SHIELD

seat on either side and also gives additional arm room. The Duquesne pattern top for runabout use is so arranged that when the top is folded it clears the rumble seat and permits of easy access.

Pantasote Co.—Pantasote, the well-known substitute for leather, will be seen in a very extensive display to be made by the Pantasote company. This pantasote will be displayed made up and in the piece in the form of top leathers in a large variety of colors, upholstery goods, and many combinations of mackintosh goods for slip covers.

Rands Mfg. Co.—In the tops made by Rands it will be noticed that the company is using double-tube reinforced sockets,

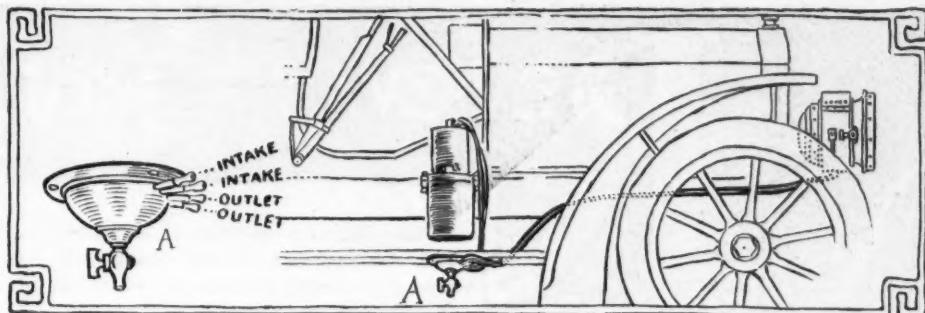


FIG. 8—E. & J. CONDENSATION CUP

laminated wood bow and reinforced curtains. Each one of its tops is equipped with the Rands patent three-piece storm front with two side V curtains. This allows of a front drop curtain without the necessity of applying the V side curtain.

Rushmore Dynamo Works—Making its show debut, the multiplex, or diverging lens searchlight, is to be the attraction at the stand of the Rushmore Dynamo Works, the important feature of it being that it overcomes the flickering, or dancing of the light beam, due to the flickering of the gas flame when the car is driven a very high speed. This is accomplished because as the light passes through each of the lens strips it is equally distributed over the whole field of the searchlight beam, so that it does not matter whether one or a number of the strips are covered up, as the light coming from the remaining strip is distributed over the same field. This new invention consists in fitting the front door of the searchlight, Fig. 6, with strips of glass, A, A1 and A2, the rear surface being plain and the front surface ground convex. These strips are about 2 inches wide, and spread the beam of light in a horizontal plane only. B, in the illustration, shows the shield help momentarily in front of the strips A, so that the light from the lens

mirror can escape only through the strips at the top and bottom, A1 and A2.

Edmunds & Jones Mfg. Co.—A lamp that is free from square corners and which has a one-piece smooth head without a rivet and one-piece bottom panels without a rivet, with the exception of the points of contact with the body, is the gas headlight which is the Edmunds & Jones company's leader for 1909. No solder whatever is used in its assembly, which leaves an exterior surface smooth and easily cleaned. In the oil lamp line the body is entirely one-piece, the heads being clinched throughout. The collars are beaded into the body at the lower portion of the lamp as are the flanges at the front. In the generator line a new feature is a cup, A, Fig. 8, which takes the condensation from the acetylene as it is generated.

Triple Action Springs—These springs are used on Corbin, Lambert, Austin, Glide and other makes of cars. The top leaf bolts to the frame at the front end in case of a semi-elliptic and has a scroll rear end which attaches to a spiral spring, which at its upper end connects with the stud bolt on the frame. The action of the spiral spring is more sensitive than that of the leaf springs, and precedes the leaf spring in action.

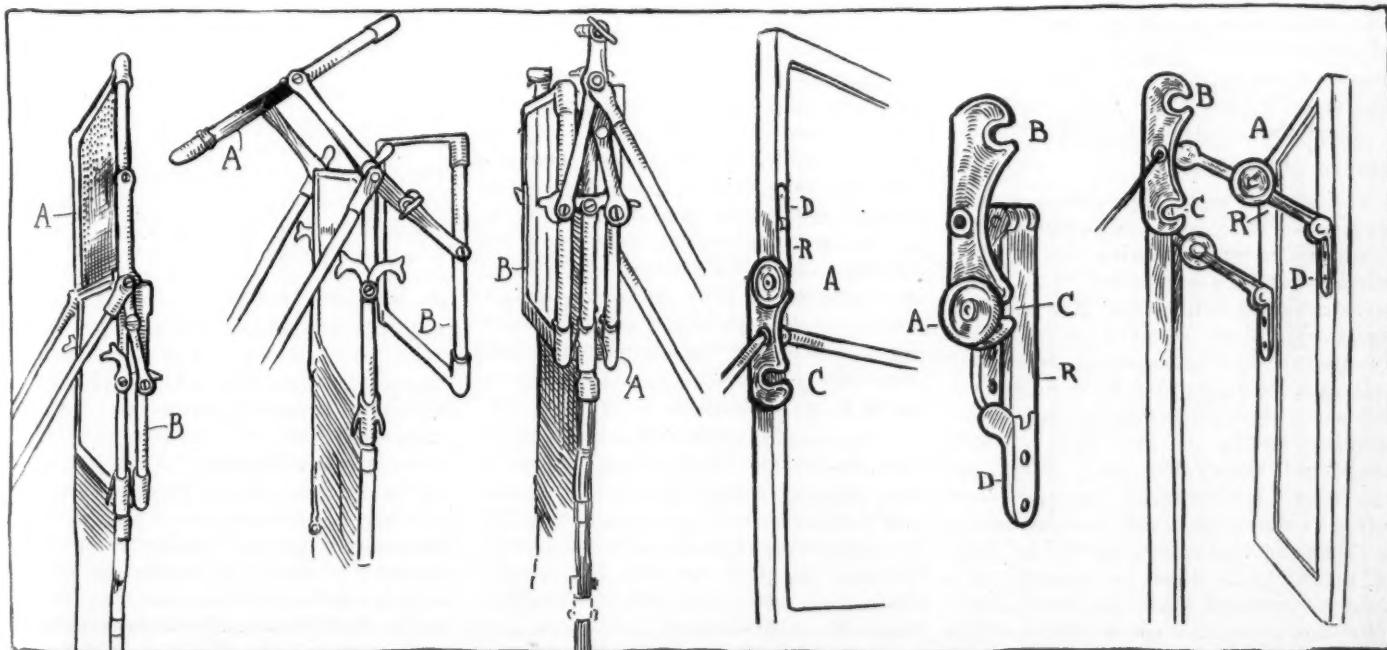


FIG. 9—TROY FOLDING SHIELD AND INSECT SCREEN

FIG. 10—VANGUARD FOLDING WIND SHIELD IN TWO POSITIONS

Review of the Year Just Ending 19

NAUGHT-EIGHT goes out far more gracefully than it came in, that is, so far as the motoring world is concerned. A year ago there were dark clouds in the sky; the country was panic-stricken and it was freely predicted that the industry surely would go to the dogs. Makers and dealers alike saw breakers ahead and in many instances sails were close-reefed by cutting down production estimates and chopping orders in two. But those dark clouds had silver linings and the first one to discover this was the motor car trade, for, strange to say, the people had to have cars, even though their bank accounts were threatened, and in consequence the motor car industry was least affected of any. By the middle of the summer all signs of a panic had disappeared and before the end of the season there was a scarcity of cars.

Looking back over the year Motor Age has discovered a fine growth not only in the trade but in what might be called the sporting department. Both the Association of Licensed Automobile Manufacturers and the American Motor Car Manufacturers' Association have flourished and start in on 1909 confident that the next year will be a phenomenal one. There have been some failures, it is true, but in many instances the concerns that ran into the financial breakers have weathered the storm. For instance, there are the Pope concerns which once more are on their feet, while there is every prospect of the Electrical Vehicle Co. getting out of the hands of the receivers in a short while. The Royal is "out of the woods" and with a reorganized company is ready for work.

Growth of the A. A. A.

The national organization, the American Automobile Association, is in a prosperous condition, its report showing that its membership has been augmented by fifty-five clubs and 3,000 individuals. The report of Secretary Elliott shows there now are twenty-five state associations as against sixteen a year ago; 187 clubs as against 132 and a total membership of 20,000 individuals. During the year the A. A. A. sanctioned twenty-four track meets and twenty-two hill-climbs. In 1907 there were fifty-two sanctions issued for track meets, a falling off that causes joy in the ranks of the A. A. A., which is opposed to this form of sport and which has decided hereafter not to sanction meets held on tracks of a mile or less in circumference.

Naturally, the chief interest in a review

of any industry centers on its strength, and with this idea in mind Motor Age has carefully compiled statistics which might throw some light on this subject. Of course, it is almost impossible to get down to exact details in this matter, but a gathering of the threads would seem to indicate that there were in the neighborhood of 75,000 cars manufactured in this country last year, the American Motor Car Manufacturers' Association approximating the output of its members at 29,150. The A. L. A. M. figures give 24,200 for the fiscal year ending October 1, while in all probability there were 15,000 made by concerns not allied with either. In line with this comes the statement of Alfred Reeves, general manager of the A. M. C. M. A., who spoke as follows recently:

Alfred Reeves' Figures

"The statistics of the past 10 years are our main guidance for the future of this great industry. Many of the early figures are lacking, but it is safe for us to say that the motor car sales in 1903 were considerably less than \$8,000,000, which has increased to over \$105,000,000 in 1907, while this year's figures, when compiled, will show almost, if not about the same, despite the recent financial depression. During 1907, something like 52,000 cars were made and sold and this year will supply about the same figures, although most of them are of the small type. To transgress a bit, it is worth nothing that the motor car business has suffered in volume less during the past 12 months than any other line, although the increase was on the side of cars selling for \$1,500 or less. It is estimated that the present capital of the motor car business is about \$105,000,000, with an additional \$36,000,000 in kindred trades, and \$57,000,000 more in garages and retail salesrooms, making a total of \$198,000,000. According to latest figures obtainable, there are 58,000 employes in the motor car factories in this country; about 29,000 employed indirectly in the making of parts, while there are 21,500 in the sales and garage establishments. This gives a total of more than 108,000 employes.

A. M. C. M. A. Statistics

"The records at the office of the American Motor Car Manufacturers' Association show that there are in this country 253 builders of cars, of which at least 123 are beyond the experimental stage, and are placing practical cars on the market. There are not fewer than 500 different trades involved in motor car manufacture, running from leather, varnish, broadcloth and buttons, to steel, brass and rubber.

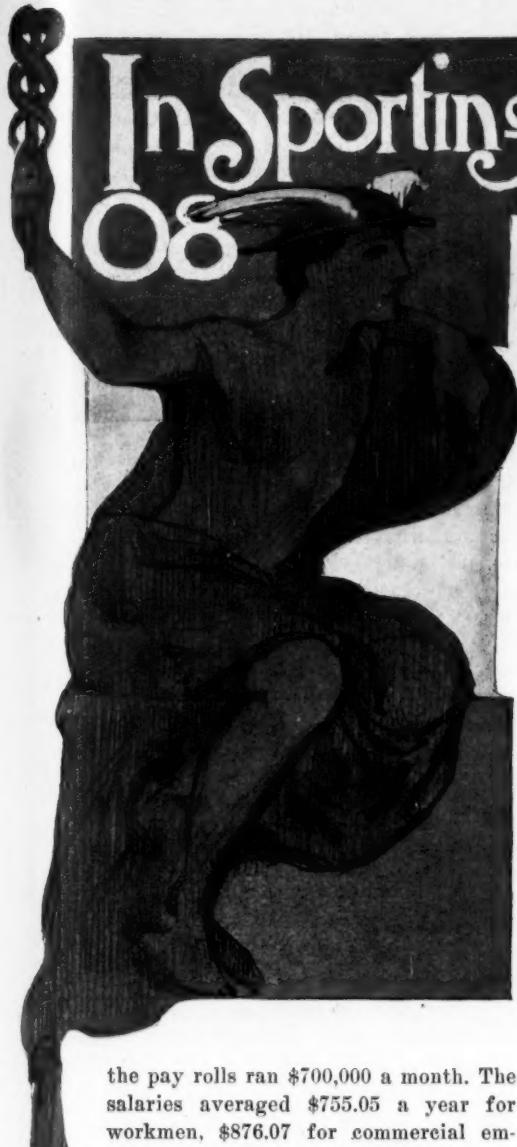


"Although the importation of motor cars is fast decreasing, it is a fact that some \$28,000,000 worth of foreign cars have been sold here. The trend is now going the other way, and the export trade of the American maker is increasing rapidly. It doesn't take very much of an imagination to figure that with our business methods, our unexcelled mechanics, our wonderful automatic machinery and our perfect factory systems, America will continue its lead in motor car building, both here and abroad.

"With 52,000 cars as a conservative estimate for this year, it is safe to say that 175,000 cars have been sold here during the past 8 years. They are big figures, but it is a big industry."

A. L. A. M. Figures

Estimates prepared recently by the A. L. A. M. for the consideration of the ways and means committee, which is discussing the motor car tariff, stated that there are 253 makers of cars in this country, of which number probably 100 can be ranked as important. Henry B. Joy, chairman of the committee representing the industry, stated that the market value of the products of the Packard, Locomobile, Peerless, Franklin, Thomas, Reo and Winton will exceed \$37,500,000 for the current fiscal year. He said these companies carry on their pay rolls 11,400 employes and that



In Sporting and Trade Lines



Manager E. P. Chalfant, of the A. L. A. M. "Furthermore the decrease appears in total value of sales rather than in quantity of cars sold; the aggregate sale of association cars was within 500 of the number sold the year before. This indicates a fundamentally healthy condition of the industry. The gross sales of association cars for the third quarter of 1908 exceed by \$1,000,000 the gross sales for the corresponding quarter of 1907. We are receiving favorable reports from our members and from dealers all over the country, and the present outlook is very encouraging generally."

Registrations of Cars

Now as to the number of cars in use in the United States on December 1, 1908. The only way to get a line on this is through the registrations, after which one can get a fair idea by means of estimates. There are twenty-nine states in which owners must register with the commonwealth, and returns from there declare 250,203 cars have been registered. Averaging for the remaining states and territories, and 70,938 more cars are discovered, so it would seem as if there were approximately 320,410 motor cars in the United States. In the way of new registrations, for 11 months this year, twenty-eight states give 89,169, while an estimate for the entire country gives 145,237.

In six of the states—California, Illinois, Massachusetts, New Jersey, New York and California—there are 162,760 cars registered, more than half of the total for the entire country. New York of course is the banner state, with 64,500 registrations. New England is strong, it being estimated there are at least 30,000 motor cars owned in that section at the present time and a conservative estimate of their value would place the figures at between \$50,000,000 and \$75,000,000. There has been a steady increase in each of the six states, and the registration shows approximately one-third more cars owned now than there were owned a year ago. Massachusetts shows the greater gain, but this is to be expected because of its greater population and splendid roads. These figures are based on the registrations up to about December 10 of this year.

Figures from New England

Beginning with Maine, there were 2,238 cars registered a year ago, and this year 987 more were put on the list, making a total of 3,225. In New Hampshire the figures of a year ago were 1,980, and for this year they were 2,732. That shows a gain of 752. The officials in that state, however, say the total should be reduced somewhat, as a number of cars have gone

out of use without any record having been made of them. For a small state, Vermont has been making much progress in motoring, and the total gain for the year in that state was 310. The figures for 1907 were 1,316, while a few days ago they were 1,926.

There seems to be no diminution in the demand for cars in the Bay state, and this year there are times when cars were being registered at a rate of nearly 100 a day. Up to early December of 1907 the registration was 7,733. These were not true figures as to ownership, for some owners refused to pay the extra \$5 tax levied in the middle of summer and ran their cars for some time and then stored them for the winter. This year the registrations began early and still continue good, even though a tax in December is registered December 1, 17,439 cars.

In Rhode Island no record was kept as to how many machines were on the books last year, but as near as one of the officials could estimate it there were fewer than 3,000 machines. The number on the list now is about 3,400, so that a fair estimate of the gain would put it at about 500 machines. Connecticut shows a good margin, too, much better than any of her sister states, Massachusetts excepted. In 1907 there were 4,450 cars enrolled, while this year the figures stand approximately 5,725, or a gain of 1,250 machines. So all told, 30,000 does not seem an excessive number for New England.

Table of Registrations

In the following table will be found reports from each of the twenty-nine states in which state registration is required:

	In 1908.	Total.
California	5,012	19,375
Connecticut	1,250	5,725
Delaware	431	744
District of Columbia	1,198	2,668
Florida	209	700
Illinois	6,175	17,296
Indiana	3,119	8,548
Iowa	3,085	7,797
Maine	987	3,225
Maryland	1,701	5,874
Massachusetts	9,706	17,439
Michigan	1,155	7,405
Missouri	1,850	4,105
*Minnesota	3,250	4,620
Nebraska	2,071	4,175
New Hampshire	752	2,732
New Jersey	19,021	19,021
New York	14,700	64,500
Ohio	†	10,074
Oregon	694	1,290
Pennsylvania	5,439	25,120
Rhode Island	500	3,400
South Dakota	806	1,731
Tennessee	434	1,482
Vermont	310	1,026
Virginia	708	2,080
Washington	885	1,500
West Virginia	205	505
Wisconsin	2,016	6,137

* Estimated

† Law in operation 4 months

the pay rolls ran \$700,000 a month. The salaries averaged \$755.05 a year for workmen, \$876.07 for commercial employes and \$1,202.41 for technical men, as compared with the European scale: \$306 for workmen, \$602.50 for technical help and \$529 for commercial employes. This, Mr. Joy says, shows workmen in American factories are paid two and one-half times, approximately, what they get for the same kind of work in the same kind of factories in Europe. Also the A. L. A. M. made the declaration that not 10 per cent of the American manufacturers is making money at the present time. In 1902, it is stated, there were fifty-one concerns in business; that there were 166 on December 31, 1906, of which number twenty-one had survived from 1902. An estimate as to the value of the 1909 product places the figures at \$150,000,000.

"Although the 12 months ending November 1 represent a period of tremendous business depression throughout the entire country, affecting in particular all manufacturing enterprises, a comparison of figures shows clearly that the decrease in volume of business done by the members of the Association of Licensed Automobile Manufacturers has been due to conservatism in manufacturing their 1909 product rather than to an abnormal falling off in the demand for new cars," says General

Report of the Year's Business from the Big Motoring Centers

Census of 1908 Business

	Cars sold	Dealers	Makers represented
Detroit	1200	28	41
New York City ..	7344	140	100
Chicago	8500	75	81
Indianapolis	1741	72	41
Philadelphia	2400	41	58
San Francisco ..	*5500	34	36
Boston	3500	45	65
Buffalo	800	21	25
Toledo	1000	18	27
Worcester	314	29	25
Kansas City	2800	22	45
Cleveland	490	29	38
Washington	275	19	41
Denver	1550	31	58
Baltimore	1000	27	44
Minneapolis	2300	39	52
Pittsburg	700	42	55
Atlanta	350	10	12
Syracuse	250	10	13
Milwaukee	780	31	43
St. Louis	800	37	52
Hartford, Conn. ..	400	15	29

L* Sold on Pacific Coast

By Paul H. Bruske

of motor car equipment are all running full force and many of them night shifts.

None of the local factories makes its complete car under the roof of its own factory, though some come very near doing that. The great majority have found it economy, however, to have the specialized labor done at the other establishments of the city which have sprung up to fill this demand. Manufacturers of accessories, working on the plans of the designers, have come to play an increasingly important part and all of them are prospering along with the factories whose work they are doing, according to specifications so rigid as to guarantee the standard nature of the product.

A marked adherence to type will feature the Detroit output this year. But one of the large factories adheres to the expensive type of highly-powered car. The others have tacitly agreed on the production of light, four-cylinder cars. The

Ford Motor Co., which led in numerical production last year, already has contracted for material for 17,500 cars and an authoritative statement from the factory places the firm's ambition at 25,000 cars for 1909. These will almost all be light, four-cylinder touring cars, the firm having entirely abandoned the manufacture of the six-cylinder car of high power, which formed part of its line for several seasons. This firm is now constructing an enormous factory out Woodward avenue which it hopes to occupy by the opening of another season.

Packard Increases Output

The Packard Motor Car Co., which last year manufactured 1,300 high-powered cars, this year has laid out a schedule calling for an increase to 2,300 cars, which number includes a percentage of lighter cars designed for town use, most of which will be fitted with enclosed bodies. This factory has been building annual additions and now maintains the largest plant in the city, having in use over 14 acres of floor space, with a considerable addition which will be ready for occupancy by the time the construction of the 1910 models is commenced.

The Cadillac factory has been running full force for several months and announces its intention of building a round 10,000 of its models this season. Considerable progress toward that end has already been made and the thorough preparation which the firm made for the season is mirrored in its present rapidity of production. The Cadillac output of 1908 was curtailed to 3,500 cars in order to clear the decks for the season now at hand. As a result production was started early and under a system that is giving gratifying results.

The Chalmers-Detroit, which last year produced 506 cars, is this season planning to manufacture 3,100. The firm is now well established in its handsome factory out Jefferson avenue and was early in the field with its 1909 models.

The motoring world is familiar with the deal by which the Wayne and Northern companies were merged during the year into the big Everett-Metzger-Flanders Co. This concern has devoted the closing months of 1908 to a thorough reorganization and has made its headquarters in the

DETROIT, MICH., Dec. 27—That the motor car industry is founded on a basis far too solid to be affected by a financial flurry such as occurred a year ago is the gratifying conclusion to be drawn from the manner in which the trade in Detroit has weathered the storm and come to the finish of its most unpromising season up to date, unshaken and in more prosperous condition than ever before. While the production was slightly curtailed this year, owing to the financial stringency which prevailed to the opening of the season, but one local factory of prominence suspended its operation and this one—the Aerocar—did so after paying all its debts and solely as a matter of choice, its principal owner preferring another line of endeavor.

Output of Cars in 1908

During the past season Detroit factories turned out and marketed a total of 17,361 cars. In 1909, according to present plans, Detroit factories will put on the market very close to 50,000 cars, and these in most cases include contracts already entered into for supplies and materials. These totals are compiled from the statistics given out by the Ford, Cadillac, Packard, Chalmers-Detroit, E-M-F, Brush, Regal, Blomstrom and Detroit electric factories, as well as the new Herreshoff Motor Co., which is just starting operations. They do not include, however, either the Cartercar or Rapid factories, located at Pontiac, which is almost close enough to Detroit to be considered a suburb. Neither do these figures include the output of two or three of the smaller factories whose plans are not yet announced with any degree of certainty.

Detroit's Manufacturing Prosperity

Detroit's manufacturing prosperity is increasingly dependent on the motor car, the industry now playing the leading part in the activities of the city. The plans of the factories are reflected in the activities now in operation also at the various accessory plants of the city which, in the aggregate, employ a far larger number of men than do the car makers themselves. Manufactories of motor car bodies, castings, rims, tires, wheels, crankshafts, tops, wheels, lamps, forgings, bearings and motors, as well as numerous other portions

Wayne factory, which it has doubled in size. The firm plans to market 12,000 cars in 1909 and is already making deliveries. There are now on the books over 6,700 retail orders and these, with the wholesale agreements have already disposed of the firm's entire product, it is said.

Brush Company Active

The Brush Runabout Co., which last year turned out 700 of its little cars, will this year manufacture an even 3,000, deliveries being made rapidly at present. The Regal-Detroit is raising its rate of production from 305 in 1908 to 2,000 in 1909 and its factory is a hive of industry. The Blomstrom Mfg. Co., which last year marketed 100 cars, now has its contracts made and plans laid out for an output of 1,500 Gyroscopes and Thirties.

The Anderson Carriage Co., manufacturer of the only electric car made in Detroit, has added very considerably to its equipment and now has under way the construction of 500 Detroit electrics, last year's output having been 200 cars.

Smaller Factories Busy

Several smaller factories, including the de Luxe, Crescent, Pungs-Finch and one or two others, not prominent in last year's industry, are expected to announce plans in the near future, though nothing definite can be stated as yet. The Herreshoff Motor Co. is arranging for an active year, though at present chiefly engaged in the installation of factory machinery and apparatus. The Motorcar Co. and Reliance, which have removed their factories to Pontiac and Owosso, respectively, still maintain Detroit headquarters and announce greatly increased productiveness in prospect for their new plants.

Generally speaking, a conservative estimate of the prospects of 1909 indicates that Detroit factories will about treble their numerical output during the coming year, at about double the monetary value.

Plans For Next Year

The prosperity of the Detroit motor car manufacturers, as manifested in their plans for 1909, is reflected proportionally in the plans of the Detroit retail dealers. During the past year the retail trade has undergone a revolution in Detroit. No fewer than five of the largest retailers in the city last season deserted motor row, by which term the local trade has known Jefferson avenue between Woodward and Brush, for new locations in the residence portion of the city. Two more prominent firms, still on Jefferson avenue, will move in a few months. None of the newcomers to the local trade is locating in the business portion of the city, though four of them already have secured locations out Woodward avenue. Of the remnant still remaining, at least two are in a very receptive condition for departure. At the present rate it will be but 2 or 3 years more before Detroit's once famous solid row of motor car retailers will be but a memory, though a distinctively motoring

atmosphere seems destined to remain, most of the salesrooms being taken over by dealers in tires and accessories as rapidly as they are being vacated by the out-going tenants.

Recent Additions to Row

Conditions in Detroit make the up-town salesroom distinctively advantageous. The city has as yet developed but two centers of opulence, nearly all the wealth of the city being located on or near Jefferson and Woodward avenues. All the Detroit dealers feature garage and repair work. This combination makes it almost necessary for the firms to locate somewhere near the center of activity which is the residence locality of their patrons. The Woodward avenue district is much nearer the center of the city than the residence district out Jefferson, and the fact that there still exist many vacant tracts of land right on the avenue has offered an excellent opportunity for buildings. As a result handsome new structures have been built for the local retailers at various points, ranging from $\frac{1}{2}$ mile to 2 miles from the city hall, most of the buildings representing outside capital, the dealers taking a long-time lease.

STATISTICS FROM DETROIT

Retail Trade in 1908	
Number of branch houses.....	11
Number of motor car dealers exclusive of branches.....	17
Number of makes of cars represented	41
Approximate number of cars sold in 1908	1,200
Number of tire agencies all but two factory branches.....	13
Number of supply houses.....	16
Approximate capital invested in industry in city including manufacturing.....	\$40,000,000
Manufacturing Trade in 1908	
Factories building 100 cars or more	9
Total cars manufactured by large factories	17,161
Output of smaller factories estimated	200
Factories lapsed	1
Factories merged	2
Factories removed	2
Large factories added	1
Manufacturers of accessories.....	40
Estimated output of cars, 1909.....	50,000
Employees in motor car factories.....	6,300
Employees in accessory factories.....	12,000

During the present year the Standard Automobile Co., which markets the Packard, and William H. V. Neuman, one of the largest local retailers, occupied handsome salesrooms and garages, built for their use on Woodward avenue, joining the colony which had inaugurated the movement a year before. These firms started their season in the new locations and found the result very favorable. The branch store of the Cadillac—the first established on motor row—followed and is now ready for business near the factory. The Anderson Carriage Co. has just completed the erection of what is said to be

the finest exclusively electric garage in the west, out in this district. John P. Schneider, the pioneer retailer of Detroit, is now awaiting the completion of his handsome new garage at the corner of Woodward and Bagg. A portion of this building will also be occupied by the local branch of the Motorcar Co. A handsome salesroom is now under construction at Woodward and Brady for the use of the firm of Postal & Doherty, who will handle the White and one or two gasoline cars. The Coombs-Gilmore Co., state agent of the Mitchell, another newcomer to the local trade, is already installed in its Woodward avenue salesroom. The C. B. Fear Co., another new firm which will handle the Gyroscope and Blomstrom Thirty, has picked a Woodward avenue building for its place of business. The Regal-Detroit's new branch is in this district. The Winton has been occupying a "suburban" garage all through the season, though always handled down-town heretofore. The Buick, which is establishing a new branch under the management of W. C. Orrell, will continue to inhabit the Woodward avenue district where the firm's output first gained a local foothold, under the management of Grant Brothers.

Negotiations are now under way by the Oldsmobile's Detroit branch and the J. H. Brady Auto Co. for locations outside the business district. These firms are looking at plots out both Jefferson avenue and Woodward.

Up to date the outer Jefferson district has been the stronghold of the electric, both the Fee Electric Co. and the A. W. Rumsey Co. having maintained exclusively electric garages in this part of the city. Whether or not the gasoline contingent will decide on an invasion is uncertain.

Good Year For Retailers

In general the retailers have enjoyed a very successful year, this being particularly true of those who have featured small and light cars. The Ford was considerably the numerical leader, the local branch which also covers some state territory, selling 380 cars. The Cadillac, Packard and Oldsmobile followed with from sixty-five to 100 sales, with the Maxwell, Cartercar, Elmore, Buick and Chalmers-Detroit well up. Nearly all the local distributors have state territory, Grand Rapids being the only reservation in many cases.

No failures were reported in the local trade, though several agencies ceased. The Clark Auto Co., which handled the White, went out of business in midseason, largely on account of Mr. Clark's health. The Wayne and Northern agencies passed with the merger of the factories into the E-M-F, which will handle its retail department



from its factory. The building is ideally situated, being very near the corner of Woodward avenue and the Boulevard. The E-M-F will also carry a full line of Studebakers next year.

Several lines are still unplaced, though they have been moderately successful during the past season. This is particularly true of the Reo, which, at present, has no local representation, though handled part of the season by W. H. V. Neuman.

The electric has made great strides in Detroit during the past season, the city's ideal pavements and unusual amount of parkway macadam making it an ideal field. The Detroit and Woods were the most successful in point of sales, though several other lines sold very liberally.

Motor trucks gained a pronounced foothold for the first time in the history of the trade. Over thirty of the Reliance output have been placed in Detroit and the

Rapid has been nearly as successful. Prominent users of the trucks are the Michigan Telephone Co. and the Jay Vinton firm of contractors. The local post-office does all its inter-station work and considerable of it is train delivery work with light trucks. Several milling concerns have established garages, well equipped and conveniently arranged. All the local factories employ trucks in their work about the city. The gasoline truck is practically universal, a local stove company being almost the one advocate of the electric vehicle for heavy loads.

Trade Well Organized

The retail trade in Detroit is extremely well organized, the Detroit Automobile Dealers' Association, including nearly all the prominent members of the trade. This organization conducted its own show last winter and realized a handsome profit on the undertaking. It is repeating the show

this year with the added qualification of a monopoly of the field, the former promoters having decided that it was useless to fight the united front of the dealers, who stood by each other and refused to exhibit at the counter attraction.

Competitions of Year

The D. A. D. A. also conducted the only systematic competition of the year in Michigan, this being an endurance run from Detroit to Saginaw, Bay City and return by way of Lansing and Kalamazoo. The run was a severe tax on the cars entered but was a success in every way, being rigidly judged and furnishing a gratifying number of perfect scores. The organization had planned to give several other competitive events but was prevented by various reasons, a fall run being declared off on account of the scarcity of 1909 models. The year closed with a good balance in the treasury.

Indianapolis Goes Through Year With Flying Colors

By Clarence L. Cummins

pay a higher price, bought medium and low-priced cars new instead of purchasing higher grade used cars at the same price.

The record of the secretary of state shows that 3,419 motor cars and motor cycles have been registered since January 1, and of this number 1,741 have been sold by local dealers and branch houses. Indianapolis sells at least one-half of the motor cars sold in the state, many of the local dealers being also distributing agents for the whole state or for several counties.

Probably the best local record is that of the Buick-Losey Co., which reports it has sold and delivered 302 cars during the last year. Other companies have sold more cars than this, but they have been divided among two or more makes.

Changes of Year

There have been more changes and additions in motor car circles during the last year than ever before. The H. T. Hearsey Vehicle Co., with the sale of the stock of Frank Staley to F. I. Willis, changed its name to the Hearsey-Willis Co. During the last year the company represented the White, Rambler, Pope-Waverley, Marion and Overland. Next season it will sell the White, Rambler, Waverley and Mitchell. The Indiana Automobile Co., owing to its increasing business, was compelled to build a substantial addition to its building at 220-224 East New York street. The addition fronts on Massachusetts avenue and contains 17,000 square feet. The company expects to continue its 1908 line, consisting of the Franklin, Peerless, Autocar and

Thomas and will add the Olds next season. In August the Independent Automobile Co. was organized by C. R. Newby, the 1908 Indiana representative of the Olds, the new company expecting to handle the Oakland during 1909. The company, however, has discontinued business, Mr. Newby buying an interest in the State Automobile Co., and that company will represent the Oakland. The State Automobile Co., by the way, will be one of the newcomers in the retail field next season, having been organized in September by Jacob Herff, Sol. Allman and J. R. Schmidt and leasing the building at 415-419 Massachusetts avenue. Mr. Schmidt has since sold his interest in the company to C. R. Newby.

In August Frank J. Fanning established a sales agency for the Chalmers-Detroit at the building now occupied by the State Automobile Co. On December 1 the branch was moved to 11 West Market street, where the Chalmers-Detroit and Pierce-Arrow will be carried next season.

Two moves were made by Finch & Freeman, agents for the Richmond and Auburn. The company first moved from 23 East Ohio street to 27-33 North Capitol avenue with the Indiana Carriage Co. However, the latter company decided to sell the Jackson and Regal next year, so Finch & Freeman moved into new quarters at 33 South Capitol avenue.

Addition to Colony

Another important addition to the trade was the Motor Car Sales Co., which was organized recently by B. W. Twyman, formerly with the Gibson Automobile Co., C. C. Hauger and C. O. Britton. The com-

ago dealers and manufacturers in this city would have said that the outlook for the 1908 trade in motor cars was poor; they would have told that people who had made deposits on 1908 cars were asking to have their deposits returned and their orders canceled. None of the motor car factories was working full time; the dealers were extremely pessimistic instead of optimistic.

Glancing at the record of the year just closing, it shows that the prophecies of a year ago have not been fulfilled. The output of the factories has been larger than it was in 1907. Reports of sales by the dealers, which have been verified by the Indiana registration records, show that dealers have sold more cars than in any previous year of their history. Far more orders for the coming year are booked than were booked a year ago. The panic, apparently, while injuring other lines of business had no serious effect on the Hoosier motor car industry.

It is true that the number of high-priced cars sold has been fewer than it was in 1907. On the other hand, the number of medium-priced cars sold was much larger, while the sale of cars costing under \$1,200 has been the largest in the history of the state.

Overstocked On Used Cars

The only complaint dealers have to make, is that they are overstocked on second-hand cars. In hard times it might be expected that the demand would increase for used cars. Such was not the case this year. Purchasers who felt they could not

pany will be distributing agents in Indiana for the E-M-F and Studebaker next season and has taken quarters with the Willis-Haywood-Holcomb Co., 330 North Illinois street.

During this season O. S. Peck has represented the Cadillac, but on September 8 he organized the Cadillac Automobile Co. of Indiana, taking F. O. Fitton as a partner. The company moved from 330 East Market street, exchanging quarters with the Knickerbocker Auto Co., 23 East Ohio street, an exclusive repair shop.

The Buick-Losey Co., of which R. H. Losey is manager, has been confronted with the question of lack of space, ever since it was established here. First the company located at 415-419 Massachusetts avenue but later took the building vacated by the Capital Auto Co. at 130-132 East New York street. A few days ago the company leased a three-story building in the rear of the New York street place and has connected the two buildings by a tunnel.

In addition to conducting a retail business and garage, R. M. Hutchinson, of the Morton Place garage, states that his company will begin the manufacture of light trucks and delivery wagons next season. A line of two and three-cylinder two-cycle cars will be built, especially adapted to the grocery and other trades requiring light delivery service. During the last season the company has sold the Regal and Sayres and Scoville. For the time being the latter line will be continued, but the company has not decided on its 1909 line of pleasure cars.

Will Handle Pope-Toledos

The Best Automobile Co. has been organized to represent the Pope-Toledo next season, a car represented for some time by Frank A. Beck, 721 North Illinois St. Mr. Beck will continue in the undertaking, livery and motor car repair business.

One of the best equipped buildings of the last year was that erected by the Indianapolis Motor Car Co. at 419 East Market street, Indiana agent for the Rapid line of commercial vehicles and top manufacturers. For a time the Reagan Motor Car Co., agent for the Haynes, was also located in the building, but this company has quit business.

In July the Fisher Automobile Co. moved into its new building at 400 North Capitol avenue, said to be the largest garage and sales room in Indiana. The company this season has represented the National, Stoddard-Dayton, Maxwell and Mitchell, but has given up the Mitchell agency for the Overland agency next season.

When the Fisher Automobile Co. changed locations, F. B. Willis, who had been secretary, and Miner E. Haywood, a stock-

STATISTICS FROM INDIANAPOLIS

Approximate capital invested in industry, including factories, dealers, branches, supply houses, etc.	\$1,626,500
Number of branch houses in city.	3
Number of motor car dealers.	19
Number of makes of cars represented.	41
Approximate number of sales.	1,741
Number of exclusive supply houses.	1
Motor car factories.	9
Carburetor manufacturers.	3
Accessory manufacturers.	4
Motor car distributing agencies.	1
Exclusive repair shops.	3

holder in the company withdrew. With J. Irving Holcomb and Raymond A. Holcomb they organized the Willis-Haywood-Holcomb Co., taking the building vacated by the Fisher company at 330 North Illinois street. The company has taken the 1909 agencies for the E-M-F, Studebaker, Packard and Apperson, cars that have not previously been represented in the city.

New Agencies For 1909

Other 1909 agencies, not previously mentioned, will be as follows: Gibson Automobile Co., Ford, Premier and Reo; John A. Boyd, Knox; S. J. Summer, Holsman; D. B. Sullivan Auto Co., Lambert; Indianapolis Automobile Co., Cartecar; E. G. Rexford, Economy.

The Overleese Tire Repair Co., formerly at 118 West Ohio street, has discontinued business, Mr. Overleese taking charge of the tire repair department of the Hearsey-Willis Co.

There are now nine concerns in Indianapolis manufacturing motor cars. They are: Premier Motor Mfg. Co., the Nordyke & Marmon Co., American Motor Car Co., Overland Automobile Co., the Waverley Co., National Motor Vehicle Co., R. H. Hassler, Rex Motor Car Co. and the Cole Carriage Co., the last three-named concerns having prepared to manufacture high-wheeled, solid-tired vehicles next season.

There have been only two important changes in manufacturing circles. About 2 months ago J. N. Willys, president of the Overland Automobile Co., and E. B. Campbell bought a controlling interest in the Marion Motor Car Co. As a result the Marion has been discontinued and the plant is being used as a part of the Overland factory.

The local plant of the Pope Motor Car Co. also was sold at receivers' sale a few months ago to a company headed by W. B. Cooley and H. H. Rice, the latter having been with the Pope interests for some years. With \$200,000 capital the Waverley Co. was organized and the plant purchased. The company continues the line of electric vehicles manufactured under the former Pope management.

Large Business in Tires

An exceptionally large business has been enjoyed during the last year by the G & J Tire Co. and the company is now building a large addition to its plant in order to take care of the 1909 trade. This is the only tire factory in the city.

Recently the Speed Changing Pulley Co., manufacturer of Carrico and Detamble engines and carburetors, moved from this city to a new plant at Anderson, the company having been given a substantial bonus for moving.

Wheeler & Schebler, manufacturers of the Schebler carburetor, have had a business much in excess of 1907. The company moved into its new plant about 1 year ago, increasing its output.

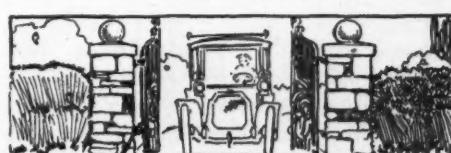
One of the noticeable features of the 1908 trade has been the large number of commercial vehicles sold. A majority of these have been gasoline cars, although there are a large number of electric cars in service, the Adams Express Co. alone using twenty. On January 1 the Indianapolis police department purchased a Rapid patrol wagon and will purchase another one January 1. On that date the city board of health will place an ambulance in the emergency service at the city dispensary. A Coppock truck has just been purchased for the use of the fire alarm and telegraph system of the fire department and the purchase of motor fire fighting apparatus is contemplated next year.

Using Commercial Trucks

Other companies who have added motor trucks and delivery service during the last year have been: Bertermann Brothers, florists; A. Burdsal Co., paint dealer; Hayes Brothers, plumbers; Central Supply Co. and Indiana Supply Co., wholesale dealers in plumbers' supplies and tools; Standard Paper Co. and Capital Paper Co., wholesale paper; City Express Parcel Delivery Co., parcel deliveries; Joseph Rink, retail furrier; Elgin Dairy Co., produce; Hamilton-Harris Co., wholesale cigars; T. F. Gibson, retail butcher; Polk Milk Co., retail milk dealers; Shank Furniture and Storage Co., second-hand furniture and household goods mover; H. Lieber Co., retail art store; Wasson & Finehout, sightseeing; Pettis Dry Goods Co., furniture department; Prest-O-Lite Co.; Eli Lilly Co., manufacturing chemist.

There are now four sightseeing companies in the city, all of which have had an excellent business during the last year. Wasson & Finehout, who began business during the last season have ordered two additional cars for next year and will experiment with motor car excursions and picnics.

The postoffice department recently began an interesting test with motor cars for collection service. Two Overland cars, built from a special design, were leased for a period of 1 year and during that time will be given a thorough test. If the test is successful two or more cars will be purchased. The two cars are caring for three former horse-drawn vehicle routes.



Greater New York Dealers Looking Ahead to a Prosperous Season in 1909

By Harry W. Perry

NEW YORK, Dec. 28—Christmas, 1908, lost none of its wonted good cheer in the trade. The gloom of a year ago has disappeared in the light of recovered trade, and managers of branch houses and agencies are now looking forward to the largest business year they have ever enjoyed. Dire predictions that followed the financial panic which ushered in the first big motor car show last winter have not been fulfilled; failures since the first of last January have been few and unimportant as compared with other lines of business, notwithstanding that the motor car has been looked upon as a luxury that could most easily be dispensed with in hard times. The row, extending in upper Broadway for forty blocks north from Forty-second street, is a livelier scene today than ever before in its short history, although the era of removal from the little, old row of 5 years ago in Thirty-eighth street, only a short block in length, has been completed and the wonderful expansion in salesroom and garage facilities that occurred in 1906 and 1907 has been succeeded by a temporary lull to allow the normal growth of trade to catch up.

Few Vacant Salesrooms

There are very few vacant salesrooms on the row, and such as are idle have been so only a short time and are not likely to remain vacant long, notwithstanding rentals are high. The only big garage that has been erected in Broadway this year has just been completed at Sixty-fourth street. It was built by capital outside of the industry and is the largest garage and sales establishment on Broadway. It was erected by Robert Goelet and is of concrete construction, thoroughly fire proof and up-to-date. It forms an obtuse angle in the northeast corner of Broadway and Sixty-fourth street, presenting an expansive and ornate front to Lincoln square, facing the Empire hotel. The entire front on both streets is faced with glazed white terra cotta, like the Packard garage on the corner of Sixty-first street, on the west side of Broadway. Enough applications for space in the new Goelet building have been received, it is said, to fill it several times over, and it is expected that occupancy will begin soon after January 1.

The only other large garage that is vacant stands at Broadway and Fifth street and never has been occupied since it was erected about 3 years ago by the Wendel estate, which has refused many offers from motor car concerns to lease it. Garages on side streets where rentals are lower, are in active demand by new taxi-

cab operating companies, which have had great difficulty in finding suitable quarters. The New York Taxicab Co., which operates 600 Darracq motor cabs, has just completed and occupied a new fireproof brick garage in West Fifty-seventh street near Tenth avenue. The cost of construction was about \$200,000. During the past summer and fall the company was obliged to keep more than 100 of its cabs in live storage under a big circus tent in a vacant lot on Eighth avenue between Fifty-seventh and Fifty-eighth streets. It also has unexpired leases on two old livery stables in West Sixtieth and West Sixty-second streets, just off Broadway, which it has occupied since it started the taxicab era in this country in the early fall of 1907.

Fortunes in Garage Buildings

Garages in Broadway range in cost from \$100,000 to \$500,000 each, and it is estimated that they have a combined capacity to house about 10,000 cars. The development of the row has been so rapid that there are few remaining available sites for large garages between Forty-seventh and Seventy-second streets. Three large garages erected by the Century Realty Co. at the northwest and southwest corners of Broadway and Sixty-second street were leased at full market rates by the builders and before completion were sublet by the lessee at almost double the first rentals.

Although 5 years ago the greatest row in the world was the Avenue de la Grande Armee, in Paris, New York's row in upper Broadway now exceeds it in the attractive character of its salesrooms and garages and also in volume of sales. The new Thoroughfare building, occupying the block in Broadway between Fifty-seventh and Fifty-eighth streets, has become a very beehive of dealers in motor car specialties. While little building was done by motor car companies during the past year, the coming year is sure to see renewed activity, since it has been announced recently that the Peerless Motor Car Co. has bought a large plot of ground at Broadway and Fifty-seventh street and intends to build a large modern salesroom for its own use; and A. T. Demarest & Co., the carriage builders and agents for several leading foreign cars, have leased an adjoining plot for the erection of a new building on the immediate corner of Fifty-seventh street. This move is particularly significant of the decline of the fine carriage trade and the rise of the motor car.

Plans for new buildings specified as garages filed with the department of buildings during the year 1908 had a combined estimated cost of \$320,000 for five structures, as compared with \$272,000 for nine garages for which plans were filed during 1907. These figures, however, are no criterion of building activity or of value of Broadway garages, since many of the latter are specified as salesrooms and storage, while the smaller garages that are building are for private use.

Extent of Retail Trade

The extent of the retail trade in New York is so great that it would be a herculean if not actually an impossible task to arrive at even an approximately accurate record of sales. This can be done only by the active and honest co-operation of all of the branch houses, agencies and importers through such a central organization as the New York Automobile Trade Association and the affiliated Importers' Automobile Salon. The time for this does not appear to have arrived yet, however, and until the trade has settled down more and managers have more time to devote to the interests of the trade as a whole instead of to individual interests, there is no inducement to establish a statistical department for the keeping of lists of dealers and records of sales.

From the carefully revised lists of the Automobile Trade Directory and the Auto Directories Co. for January 1, 1909, one finds that in Manhattan and the Bronx there are about thirty branch houses of American motor car manufactory, about seventy additional agencies for American cars, and thirty agencies for foreign cars. There are seven car manufactory in the city itself. In all, there are 125 garages for the care and storage of machines, as distinguished from salesrooms, and thirty of these are equipped as charging stations for electric vehicles. Fifteen shops make a specialty of repairing only. Of jobbers in sundries and supply dealers there are thirty-three. In Brooklyn there are forty agencies for motor cars—nearly all domestic—and there are sixty garages.

Growth of Taxicab Business

One of the most remarkable developments of the year just closed is the taxicab business. Very few persons, even in the motor car industry itself, have any real conception of the rapid growth of this new business, which did not exist at all 2 years ago. It is almost co-existent with the period of panic and money stringency, which makes it all the more wonderful. The lists show that there are more than

forty companies and livery stables in New York city now engaged in operating motor cabs equipped with fare-calculating and indicating instruments. While many of these are small and operate only a few machines, it is safe to say that there are half a dozen that are running fifty or more cabs, and that there are now more than 1,000 taxicabs at work in the streets of the metropolis.

Sales of motor cars during the past year in this city can be arrived at only roughly by calculation from state registrations in Albany. A store to store canvass would, if anything, be less accurate owing to the unwillingness of many dealers to divulge the exact amount of their business. In New York state the surprising number of 65,000 cars have been registered during 1908. Some 15,300 of these are new registrations that did not appear the year before, and, according to the Auto Directories company, 60 per cent of these, or 9,180, are from Greater New York. Of this number, 20 per cent may be assumed to be transfers of second-hand cars, since the state law requires the issuance of a new license and cancellation of the old one when a car changes owners. Thus, we find that the actual sales of new cars for the year aggregated 7,340. As New York is the greatest market in the country for high-priced cars, and the branch houses, importers and agents for high-class machines outnumber the medium and low-priced agencies, it is a conservative estimate that the average price of cars sold is \$2,500. Placing the years' sales at the round figure of 7,000, this gives a total volume of business in complete cars alone of \$17,500,000. It is entirely out of the question to calculate how much money was spent in accessories and supplies.

Bright Outlook Ahead

Regarding the outlook for business during the coming year there seems to be but one opinion—that it is better than it ever was and that the volume of sales will be greater by far than ever before. The purchasing public appears to have recovered fully from the influence of the financial depression, and sales during the past fall and early winter have been away ahead of sales for a like period at any time in the past. For example, Manager M. J. Budlong, of the Packard branch, says that 400 Packards have been sold through the New York house and that the 1909 output is almost disposed of already; C. A. Emise, of the Lozier store, says sales were 60 per cent larger in 1908 than for the preceding year, and in 1907 the Lozier sales were greater than ever before, despite the panic. According to W. P. Kennedy of the Studebaker company, its business is fully 100 per cent better than in 1907. Sales have this season continued right up to the end of the year, notwithstanding the proximity of the shows, which Mr. Emise accepts as an indication that buyers now depend less than ever before upon the shows to decide them in their purchases. One promising

feature of the new year's outlook is the increased sales that may be expected as a result of purchases deferred last year owing to general business depression and uncertainty. An indication of the trend of business is the fact that the state registrations during the closing months of the year ran 100 a day more than in the same month a year ago.

Electrics Gain Good Hold

Electric vehicles continue to hold favor as town cars and to supplant the big gasoline limousine and touring car. Since the Pope Mfg. Co. and the Electric Vehicle Co. went into the hands of receivers last winter, temporarily eliminating the Pope-Waverley and Columbia electrics, principal activity in this branch of the local trade has been confined mainly to the Baker, Babcock and Studebaker machines. The Baker agency, formerly held by C. B. Rice, has been reorganized as the Baker Motor Vehicle Co. of New York, and following bankruptcy proceedings to clear up old indebtedness, expects to do a good business, especially in the 1909 closed car. Instead of being reduced, the prices of the Baker electrics have been increased commensurate with improved construction and an increase in mileage. The Babcock electrics, formerly handled by Wyckoff, Church & Partridge, are now sold by the Babcock Electric Carriage Co. Plans regarding the future of the Waverley are not yet known, although the Pope-Hartford line, formerly handled by A. G. Southworth & Co., is now in the hands of a new concern named the Pope-Hartford Automobile Co.

Year in Commercial Line

During the past year gasoline trucks and delivery wagons have made considerable advance in New York, a field previously recognized as a stronghold of the electric commercial vehicle. Of the twenty-five Packard trucks built and sold during the year, a dozen came to New York, and half of these were taken by the Adams Express Co. Frayer-Miller, Hewitt and Knox trucks are coming into increased prominence.

STATISTICS FROM NEW YORK

Manhattan and The Bronx	
Branch houses of American car factories.....	30
Agencies for American cars.....	70
Agencies for foreign cars.....	30
Local manufacturers of complete cars.....	7
Total number of garages.....	120
Electric charging stations in garages	30
Exclusive motor cars repair shops	15
Number of taxicab operating companies	44
Branch tire houses and agencies	20
Number of supply dealers.....	33
Brooklyn	
Agencies for American cars.....	40
Number of garages.....	60
Estimated number of cars sold in Greater New York..	7,344
Estimated aggregate value of cars sold.....	\$17,500,000
New salesrooms and garages opened during year.....	60
Concerns discontinued or name changed.....	40

nence in the streets, together with some Waltham, Rapid and Lambert machines.

In the electrical field, the Studebaker, General Vehicle and Baker people are most active. It is noteworthy that the Studebaker company purposes to devote its energies in New York city chiefly to pushing its truck business, gradually dropping the electric pleasure carriage trade. Through a corps of special salesmen with an engineering training, it is negotiating with leading concerns whose business is of national and international proportions, such as the American Sugar Refining Co. It has been working quietly along new lines and the results are only beginning to appear, but before the end of the year the local branch expects to be taking orders whose magnitude will surprise the trade. The Baker company anticipates a good business in its new light delivery wagon. After a 6 months' trial of one of these wagons fitted with express body, the engineer of the American Express Co. has strongly recommended the purchase of sixteen of the same model. The General Electric Co., which now owns the General Vehicle Co., formerly the old Vehicle Equipment Co., of Brooklyn, is making careful investigations of the motor truck situation and is planning a more active campaign with the new models which have been much improved—in fact, almost completely re-designed. The Complex-Gear Co. has also entered the field with a local agency.

Tire Trade in Gotham

The tire trade of the Metropolitan district is handled wholly through branch houses which are maintained by all of the leading tire manufacturers of the country and by the Michelin and Continental companies of France and Germany, which now have American factories. All the jobbers and supply dealers also handle tires.

As usual, many changes have occurred among car agencies during the year, some dealers dropping out, others starting in, and still others reorganizing and changing names. Of principal note among those that have quit business are the Garford Motor Car Co., whose business is now handled by Studebaker; the Dragon Automobile Co.; A. G. Southworth, who had the Pope lines; the Electric Vehicle Co., which went into receiver's hands; the Rainier Co., also in receiver's hands; the Mercedes Import Co., and the Maja Co., Ltd.; the Palais de l'Automobile, which had the agency for the Delaunay-Belleville, now handled by Brewster & Co.; Archer & Co., who handled the Hotchkiss; J. S. Heller, who had the Zust, now in the hands of a new company called the American Zust Co.; the McLean Auto Co., which had the Lambert agency; Continental Motor Car Co.; Bouton Motor Co.; Rolls-Royce Import Co.; and Leon Rubay, dealer in supplies.

Altogether, including agencies and garages, there have been forty discontinuances in Manhattan during the year.

Magnitude of Motor Industry in Chicago Astonishing Because Unexpected

CHICAGO, Dec. 28—The magnitude of the motor industry in Chicago is not appreciated until one starts in to review the business of a single year, then it dawns upon him that the Windy City can compare most favorably even with Detroit, the heart of motordom. The comparison may not hold good so far as the construction of motor cars is concerned. Detroit certainly has us there, but it is doubtful if it can outpoint us in the other departments, for there are represented in Chicago more concerns that are allied with the motoring industry than are to be found in the Grand Central palace this week—makers of motor cars, manufacturers of motor buggies and of sundries, parts and accessories by the score. There are exactly 302 manufacturing concerns in Chicago allied to the motoring industry.

Chicago certainly is the center of the motor buggy manufacturing business, for here are made no fewer than ten different makes of the high-wheelers—the Holsman, the Duer, the Reliable Dayton, the Monitor, the Bendix, the Ranger, the International Harvester, the Black, the Bugmobile and the Chicago Motor Buggy Co.'s product. Here, too, are found such commercial rigs as the Holsman, the Gifford-Pettit, the Monitor, the Randolph and the Fairbanks-Morse, while in the pleasure car line we have the Diamond T, Silent Knight, Falcon, Lauth-Juergens, Triumph, Monitor, Monarch and Pullman. In the electric line there is the Woods Motor Vehicle Co., while the Jay Motor Co. is experimenting with a steam car.

Chicago's Manufacturing Strength

Touching on the manufacturing industry as a whole in Chicago, it is discovered there are listed 242 different articles made here, ranging from a big motor car down to insulated wire, each and every one contributing its share toward making this city a motoring metropolis. In the allied branches there are five makers of bodies, five of carbureters, seventeen of wind shields, sixteen of tops, fifteen of castings of all sorts, twelve of motors, two of speedometers and so on down.

Turning to the retail end, it is found there are more than eighty different makes of cars represented—eighty-one to be exact, if the writer counted right—while of these twenty-one are represented here by branch houses. There are eight big supply houses, four of which also act as jobbers, while there are fourteen tire concerns represented here by branch houses and several others have agencies.

Still continuing the census and aided by

By C. G. Sinsabaugh

the telephone directory one finds that this city fairly bristles with public garages, which are as hard to locate as it would be to count the livery stables in the city. Most of them are prosperous enough to have a telephone installed, so there is no reason to question the veracity of the directory which gives 118 motor car garages. Many of them are little affairs—old stores or ancient livery stables remodeled this purpose, but there are a dozen or so places which could stack up against the best in the land and which have every convenience imaginable and house all the way from 100 to 300 cars each.

Motor Livery Business

In the same line there are motor livery businesses by the dozen. But few of them are of the first flight, the majority having from one to three or four old cars which are used for the renting business. In addition there are half a dozen stands downtown where cars are ranged alongside the curb for public hire. There are half a dozen concerns which can be dignified by calling them motor liveries, and these half dozen have in service some 100 rigs, of which about seventy-five are taxicabs and the rest touring cars. Chicago likes the taxicabs and would have more of them. It will by spring, at which time it is expected there will be three times as many running as there are now. Only one of the taxicab companies fits the taximeter to the rear wheel, and this, it is said, may be stopped by means of a city ordinance which even now is in course of preparation, it being claimed that instruments so attached are liable to run up false mileage.

Season Slow to Open

So much for Chicago's strength. Now as to the past year. Inquiry in all the trade centers of the town would seem to indicate that Chicago's experience has been about the same as the other big cities. The financial flurry, as we like to term the panic of last winter, crimped everyone to start out with, and it was late in the summer before the buyer came out of his cyclone cellar and sat up and took nourishment. Then he made up for lost time and those dealers who had counted on long vacations in the early fall found themselves so tied down by business that there was no chance of getting away. Those who had had any surplus stock on their hands by September found it no trouble at all to get rid of the cars and 1908 goods were selling well even when the

1909 crop was coming into the market. As, elsewhere those who were selling low-priced and medium-grade cars found themselves busy despite the supposed hard times. It would seem as if those who had figured on buying high-priced cars contented themselves with something cheaper when they found their bank account endangered. They had to have the cars, even if hard times did threaten, and in this many dealers found their salvation.

Big Cars Sell Well

Still, it wasn't a bad year for the big fellows, either, and it is more than probable that on the average there were fifty cars of each of the high-priced makes sold in town, which would make from 350 to 400 cars selling at better than \$3,000. Foreign machines did not show up prominently because Chicago is not addicted to the European habit, there being only two makes, the Renault and Berliet, directly represented here. The former has a branch, while the latter is represented by the Berliet Import Co., which has the sales right for the United States.

If one should hazard a guess and say 2,000 cars were sold directly in Chicago this year he would not be far out of the way. There are some 18,000 cars registered in the state and undoubtedly one-third of these hail from Chicago. When the city collected the registration fee it had some 5,500 cars on its list, but this came to an end a year ago last July. This leaves only one way to find Chicago's strength and that is through the city comptroller, who counts noses for the wheel tax. He reports some 5,700 cars, but these do not take in the suburbs, where probably a couple of thousand more cars are located which properly come under a Chicago heading. This would make nearly 7,500 cars for Chicago, which would make it about 2,000 new ones for the past year.

Magnitude of Wholesale Business

But Chicago dealers have not been solely occupied selling cars locally. Most of the dealers have big territories, some of them running into Iowa, Indiana, Wisconsin and Nebraska and some even taking in St. Louis. Therefore, in summing up the business of the year that has passed through Chicago this must be taken into account. Then, too, there are big branch houses like the Buick, Ford, Rambler and Maxwell which have been passing out cars at wholesale in vast quantities. One of these concerns is credited with disposing of 1,400 cars altogether through the local branch, so it will be seen that during 1908 Chicago

has acted as a clearing house for thousands of cars in this territory.

Chicago, too, is a center for the supply business and one man who keeps a finger on the motor trade pulse declared the other day that five of the supply houses and the garages in the outlying districts had sold goods that totaled \$1,500,000. He figured that these garages combined had done just about as much business as did the five supply houses whose business he had reckoned in his estimate.

Chicago's motor row is changing every month. Slowly but surely it is moving southward, while the cracks and crannies in the middle are being filled up. Wabash avenue is nearly deserted. The Studebaker is camped there still and so is the Orient, but the Chalmers-Detroit, Lozier and Autocar as represented by the Levy & Hippel company is about to join the Michigan avenue colony, while the Dorris already is there. Few new buildings have gone up, though. The Levy & Hippel company is building near the Stoddard-Dayton agency, the Knox has just moved into a new place between the Buick and Rambler, while the Motor Car Supply Co. is about ready to take possession of a handsome two-story structure a few doors south of its present location. The Dorris is in a new building just south of Eighteenth street, while the new Oldsmobile branch is in a recently-built establishment just north of Walden Shaw's. The Swineheart tire, too, has a new place of its own.

Changes On the Row

Kaleidoscopic changes, though, have taken place along the row. Some have dropped out and others have come in, so if anything Chicago has gained rather than lost in strength. Of the twenty-one branches now here nine of them have come in during the present year. Palmer & Singer, Oldsmobile, Locomotive, Renault, Meteor, Velie, Babcock, Austin, and the Overland are new. Of these the Locomotive, Overland and the Oldsmobile have switched from agencies. The Velie is just locating, having taken the store now occupied by the Packard agency, which intends moving to the south end of the row next May. The Stanley is coming in with a branch for 1909.

Agency changes have switched the Premier to Webb Jay, who gave up the Kissel. Shaw gave up the Premier, Reo, and Locomobile to handle the Berliet and Thomas, the latter transferred from Coey, who took up the de Luxe. The Reo went to the Reo Automobile Co., while the Chalmers switched from a branch to an agency when it dropped the Thomas. The Bird-Sykes Co. took the Matheson when the Palmer & Singer branch opened with the Palmer & Singer line. Githens landed the E-M-F when the Olds people decided to have a branch. Branstetter is representing the Kissel.

New cars that came into town during the year include the E-M-F, P & S, Gyroscope, Waverley, Regal, Browniekar, Austin,

French Berliet, Midland, Falcon, Oakland, Pittsburg Six and Velie, while those which have dropped out include the American, Marion, Wayne, Cleveland and National. Of these the Marion and Wayne have gone out of business.

Row Moving South

Apropos of this tendency on the part of the row to shift to the south where the rents are cheaper, it is stated that some time next spring there will be a migration on the part of some of the big dealers to the district around Twenty-second street. It is said that some of the representatives of the high-powered cars believe they could establish a colony on Indiana avenue or Wabash avenue near Twenty-first street and do well. It is believed, though, Indiana avenue would be best suited for the purpose. That's where the new Stanley branch is being constructed. Walden Shaw is one block west from this, facing on Michigan avenue. Next door to Shaw is the Oldsmobile branch. The Packard agency is going to move in the spring, but just where it is not stated. At the present time it is on Michigan avenue just south of Sixteenth street, but that its intentions in the matter are sincere is shown by the fact that it has leased its present quarters to the new Velie branch. It is hinted, but the hint has not been confirmed, that the Packard people are looking with favor upon a site still farther south.

The commercial proposition is gaining a strong hold in this city. At first it was slow work because of the condition of the streets upon which business traffic is permitted. Dealers in business rigs, however, say this is no longer so now, because of the wheel tax which the city has imposed and which it already is collecting. This reaches a vast sum, about \$700,000, and it is the intention of the authorities to devote it all to the improvement and maintenance of the city streets. Considerable work along this line already has been done, but the job is one of such a vast magnitude that one does not appreciate what has been accomplished. Another year ought to make a difference and by that time the demand for commercial motor wagons ought to be much better.

Many Commercial Rigs

A conservative estimate of the number of commercial rigs in operation on the city streets at the present time places it at 250 machines, ranging in size from the fleet of little Orients used by Stevens to the big 3 and 5-ton trucks working for the

packers. The trucks have made a particularly strong impression at the stock yards and Swift and Morris, two of the leading packers, declare that one of their motor trucks can do the work of five horse-drawn rigs. An instance is cited where one of the Reliance 3-ton trucks working for Morris started in at 7 o'clock in the morning to transport seventy-five tierces of lard, each weighing 450 pounds, to a point 6 miles away. This represented 33,750 pounds, but the truck was through its work by 3:30 o'clock in the afternoon. Another instance is given where a four-cylinder truck carried 200 cases of beer in one load for Schoenhofen.

As showing the diversified interests using commercial motor trucks in Chicago, the list is made up of such concerns as Montgomery Ward & Co., the big mail order house, one of the earliest of Chicago houses to take up the motor truck; A. H. Revell & Co., the furniture house, which also broke into the game early; the McAvoy and Schoenhofen breweries, Sears, Roebuck & Co., another mail order house; the Price Baking Powder Co., the Daily News, Stevens & Co., Frank E. Scott, the transfer man; the David Parker Moving Co., the Harder Van Co., the Wisconsin Tea Canning Co., Anglo-American Provision Co., Anderson Brothers Teaming Co., the Valvoline Oil Co., Omaha Packing Co., National Lead Co., the public library, the National Casket Co., Lyon & Healy and the Cable Piano Co.

Representatives of these commercial trucks say that their chief difficulty is not with the streets of Chicago, but with the drivers. While there are some good men piloting these big rigs the demand is greater than the supply. It is easy enough to get drivers, they say, but the most of them lack experience and ability. As soon as it is possible to man the commercial rigs properly then the commercial proposition in Chicago will be a good one.

Electric Growing in Popularity

The electric is gaining a good foothold here because of the many miles of magnificent boulevards, many of them asphalt, affording an easy and luxurious way for the society woman to drive into the business district. Many of the women make a practice of driving downtown morning and evening, carrying their husbands to and from business. The men, too, like the electrics, and many of the electrics are piloted by business men who enjoy the leisurely pace. Especially is this so this winter when the warm coupe bodies make riding in an electric a luxury.

Seven makes of electric rigs are now represented in Chicago, two of them branches, the Woods and the Babcock. The Woods factory also is here and the plant is pushed to its fullest capacity to keep up with orders. In addition to these two the Rausch & Lang, Detroit, Baker, Columbus and Waverley are represented by agencies, and it is said it is the intention of the Fritschle to open up here in the spring.

STATISTICS FROM CHICAGO

Estimated number of cars sold from Chicago, wholesale and retail	8,500
Number of makes represented.....	81
Number of branches.....	21
Number of agencies.....	54
Number of garages.....	118
Number of supply houses.....	8
Number of manufacturing concerns	302
Number of articles manufactured..	242
Number of motor buggy makers...	10

Boom in November Saves Day For Quaker Tradesmen

By G. M. Schell

PHILADELPHIA, PA., Dec. 26—In one sentence the motor car business of this Quaker city during 1908 may be classed as a success. However, the expert reader of signs of the times who, a year ago, should have foretold such an outcome of the year's trade would have been stamped as a rank optimist. He would have been set down as a booster whose particular graft necessitated a hopeful line of talk. And at that he would not have made good until the eleventh hour—for it was not until November 1, or shortly after, that the boom came that saved the day.

The local trade situation during the past year showed a rather sudden tendency toward branch-house representation of many of the better-known cars in place of the former agency plan. Whether this was due to the impossibility of interesting local capital or to the more satisfactory results obtained from the branch-house method is not at present clear; probably both causes were responsible in a measure. At any rate, this year's figures show no fewer than thirteen branch houses as against five in 1907. There are twenty-eight agencies here besides, which makes a total of forty-one concerns handling motor cars exclusively. Several of these represent two or more cars, and the grand total of different makes actually handled here is fifty-four, with three or four additional cars represented by correspondents—and which will doubtless later develop into full-fledged agencies.

Only Five Withdraw

It is a peculiar fact that of the five concerns which discontinued business in Philadelphia during the past year, but one, that of Thomas B. Jeffery & Co., was a branch house. And this change was due to the desire to consolidate the eastern distributing business of the company in New York rather than to a lack of success of the Rambler in Philadelphia. On the abandonment of the Rambler branch here the local agency for the car was immediately awarded to the Tioga Automobile Co. The nine new branch houses now doing business here represent the Buick, Oldsmobile, Chadwick, Matheson, Studebaker, Autocar, Maxwell, Fiat and Grout cars. The White, Winton, Ford and Locomobile are the four hold-overs which have continued their branch-house representation from the beginning.

There has been such an unusual shake-up in the agencies that the sign-painter has been working overtime along the row during the past 2 months keeping things straight. The greatest change was that

of the agency-izing of the Rambler, after many years of apparently successful branch-house representation, the Tioga Automobile Co., away uptown, now handling that car. Then came the change whereby the agency business of the Quaker City Automobile Co.—Peerless and Franklin—was turned over to the Automobile Sales Corporation, the latter substituting the Cadillac for the Franklin, the last-named car now being the subject of negotiations for agency representation by a new firm.

The Buick, formerly represented by the Keystone Motor Car Co., has been branchized; so also has the Oldsmobile, formerly looked after by the Motor Shop; likewise the Matheson, last year under the agency management of Titman, Leeds & Co.; the Autocar, represented by the General Motor Car Co., and the Maxwell, by the Kelsey Motor Car Co. The Studebaker and Fiat have also been switched within a year from agency to branch-house representation, while the Chadwick and the Grout are newcomers in the branch-house line.

Changes of Agencies

Among the well-known cars that have been transferred from one agency representative to another here within the past twelvemonth might be mentioned the Thomas, from the Harry S. Houpt Co. to the Bergdoll Motor Car Co.; the Acme, from John L. Scull to the Theobald Motor Car Co.; the Cadillac, from Foss, Hughes & Co. to the Automobile Sales Corporation; the Overland, from the International Motor Car Co. to W. J. Sprangle; the Jackson, formerly represented by the Spencer Motor Car Co., has been taken up by Prescott Adamson, the Columbia-Renault man.

Among the agencies whose signs disappeared from the row during the year were the Girard Motor Car Co., Cleveland and American Mors; Spencer Motor Car Co., Jackson, and the International Motor Car Co., American, Marion, Overland, Darracq and Walter.

During the year there were quite a number of cars new to Philadelphians which secured branch or agency representation along the row. Among these were the E-M-F 30, by Foss, Hughes & Co.; Regal-Detroit, by T. M. Twining; the

Chadwick, branch; Chalmers-Detroit, American Locomotive, Oakland and Rauch & Lang electric, by the Bergdoll Motor Car Co.; Grout, by the Stoyle Automobile Co.; Babcock electric, by Prescott Adamson; Brush, by Oxford Automobile Co.; Middleby, by Standard Motor Co.; Garford, by North Philadelphia Auto Station, and Auburn, by Auburn Motor Car Co.

Estimating the Sales

In an effort to approximate the total number of new cars disposed of here during the past year the Motor Age correspondent sought the opinion of those best qualified to judge—the officials of the Philadelphia Automobile Trade Association, the various local sales managers, etc. As a distributing point for the Rambler, Ford and several other cars, Philadelphia's 1908 motor car business receives a boost which perhaps does not properly belong to it; but including all cars disposed of through this city the average estimate closely hugs the 2,500 mark—rather under than over that figure. It is a fact worth noting that the estimates varied comparatively little. The 2,400 cars that the average of estimates finally shows has been declared conservative, as has also the four and a half million dollars' valuation placed upon them. And it is freely predicted here that 1909's totals will exceed the six-million mark—that is, for motor cars alone.

In aggregating Philadelphia's motor car industry, besides the thirteen branch houses and twenty-eight agencies devoted solely to the sale of cars, there must be included, of course, the nine tire agencies and the twenty-one dealers in general supplies; the three exchanges, which deal in second-hand machines exclusively, and the cloud of independent public garages, numbering fifty or more, and which are scattered throughout the city wherever storage and repair possibilities are sufficiently promising to warrant their establishment. Many of these outlying concerns act as sub-agents in their especial districts for the cars directly represented along the row, and the amount of capital invested in these allied businesses totals upward of half a million dollars. A call at the city hall in an effort to ascertain the total number of garages in the city elicited the fact that all such establishments are listed under the head of "stables," and that no



attempt had ever been made by the hard-worked clerks to separate the horse from the motor car in this respect. At the boiler inspection department, however, the information was volunteered that the number of motor cars now in use in Philadelphia is a trifle in excess of 5,000.

In this aggregate is not included manufacturers of parts, such as the Standard Roller Bearing Co., Philadelphia Gear Works, Neverout Mfg. Co., the Joseph Crucible Co., the Brown Auto Top Co. and numerous others, the motor car end of whose varied businesses, aggregated, would mount up into the hundreds of thousands annually.

Increase in Licenses

A more than 25 per cent increase in the number of licenses issued by the state highway department at Harrisburg over last year is an indication that though the financial depression was widespread—and deadly in some instances—it failed to interfere materially with the natural growth of the motor car trade in Pennsylvania. Up to November 27 E. M. Major, chief clerk of the motor car division of the department reported 25,129 licenses issued. Last year the total for the full 12 months was but 19,780, and in 1906 but a trifle over 14,000.

The trade association held its annual meeting the other day, and, although the depression claimed five of the members as its victims, there were an even dozen of new candidates to take their places. The rolls now show a membership of forty-five, made up of thirty-one bona fide dealers and fourteen concerns handling tires and accessories.

The feature of the local business that is distinctly promising is the taxicab game. With twenty-six Thomases now working to the limit, the Bergdoll Motor Car Co. is building fifty taxicabs in its third-floor shops and is putting up an \$80,000 factory addition which will have a capacity of 250 of the handy little vehicles yearly.

Taxicabs in Demand

The Pennsylvania Taximeter Cab Co. is now running fifteen vehicles—made up mostly of "Yankees," with a couple of Autocars and the same number of American Mors. By January 1 there will be twenty-five in operation, and President and General Manager J. C. Hinkle says that by November 1 next his company will have at least fifty cabs running.

The Quaker City Cab Co., formerly a horse-drawn proposition entirely, has during the past year taken up the taxicab game with marked success. It has now ten Berliet cabs running to the limit, with six additional vehicles promised shortly after the 1st of January.

The commercial situation here is discouraging—distinctly so. Apart from light deliveries, the trade in business motor cars is practically at a standstill. The year's sales of heavier trucks here, electric or gasoline, could be represented by single figures, and low ones at that. The



main obstacle to their general introduction by the big department stores—whose managers all claim to be ready to make the departure when the factory people can show them it will be a profitable one—is the old story of the inability to furnish competent drivers. The young man who masters the gasoline engine and learns how to manage a car refuses to perform a common laborer's duties in addition to his own. Two men to a vehicle is too expensive. A driver of a horse-drawn vehicle can be procured for \$12 to \$14 a week. A gasoline truck driver wants at least \$16 or \$18—with a helper to do the heavy work. It is this that scares the delivery managers, and the old system seems destined to obtain—with scattering exceptions—for several years to come. True, the local police department has about concluded to install a few gasoline "hurry-up" wagons—with the announced intention of ultimately entirely doing away with horses if they prove successful—and the White company has placed a few ambulances with the local hospitals; but, full and large, the local commercial game looks very, very dead at present.

Electric Outlook in Philadelphia

The electric outlook in Philadelphia cannot be said to be particularly encouraging. One of the main obstacles to the popularity of electrics here is the impossibility of securing a direct current outside of the central business section, where the big department stores and large wholesale houses are located. Outside that district only a high-tension alternating current is obtainable, and although this defect is not incurable, the expense of installing transformers, such as mercury arc rectifiers, for instance, is so great that few of the public garage owners have even considered the advisability of putting in up-to-date charging plants. The Studebaker branch, however, is going after the electric business in a systematic manner. Where desired, rectifiers are loaned to those of its patrons who have only the alternating current, and already the beneficial effect of this enterprising move is becoming apparent, Manager Frank Yerger reporting no fewer than seven sales of electric runabouts within the past 2 months on this basis.

Never particularly strong from the standpoint of motor car manufacturing, Philadelphia this year is much less so

than it was a year or so ago. The dissolution of the Dragon company and the removal of the Chadwick Engineering Works to Pottstown, Pa., have cleaned the decks of local factories, although the Autocar, at Ardmore, and the Pennsylvania, at Bryn Mawr, while not located within the city limits, are practically Philadelphia institutions, operated mainly by Quaker City capital. Both are in healthy condition, and are planning for large increases.

Boom in Real Estate

That the motor car business has greatly enhanced the value of property along North Broad street and adjacent thereto is manifest from the figures represented by the new deals put through during the year. Take, for instance, Louis Bergdoll, whose holdings on both sides of the row will soon aggregate close to a million and a quarter dollars. Besides his own huge establishment at the corner of Broad and Wood streets, which was completed during the present year at a cost of \$225,000, and to which an \$80,000 factory addition is now in course of erection to build Bergdoll taxicabs, he owns a \$480,000 slice on the west side of Broad street, which has been rebuilt to accommodate the demand for motor houses, and is occupied by the Ford, Chadwick and Firestone brands; the Motor Shop building, which is estimated to be worth \$140,000, and the building at Nos. 202-204, formerly occupied by the Maxwell agents and which is worth \$50,000.

Another big new addition to the facilities of the row during the year was the Lea building, a huge steel and concrete affair, costing \$275,000 without furnishings or equipment, and which now houses the Oldsmobile, Lozier and Buick in as handsome a trio of salesroom-garages as any city in the country can boast of. This concern as it stands represents an investment of close to \$450,000, the three concerns mentioned paying an aggregate rental of \$25,000 a year.

Handsome Store Built

The handsome Keystone Motor Car Co. building, which cost upwards of a quarter-million dollars bare, represents as it stands an investment of over \$400,000. The big fireproof building and business of the Quaker City Motor Car Co. and the Automobile Sales Corporation could not be bought today for half a million; the White company's building, farther up the street, is worth \$100,000 in itself. From this it may be seen that the estimate of \$5,500,000 as the approximate amount of capital invested in the industry in this city is not excessive. Ten years ago land along North Broad street averaged about \$7 a square foot. The present-day value of the same

STATISTICS FROM PHILADELPHIA

Capital Invested.....	\$5,500,000
Cars sold in 1908.....	2,400
Value of cars sold.....	\$4,500,000
Makes of cars represented.....	58
Number of branches.....	13
Number of agents.....	28
Number of tire agencies.....	9
Number of supply houses.....	21

property approximates \$25 a square foot. Barring last November's legal-speed-limit run of the Automobile Club of Philadelphia, this city's motoring history from a sporting standpoint reads like a report of the contest committee of the Quaker City Motor Club. Beginning with the 2-day New Year's endurance run, which was finally won by the White after several run-offs by the clean-score survivors, there followed the annual track meet at Point Breeze, special endurance and reliability runs to the Wilkes-Barre hill-climb, the Monroe County A. A. carnival and Wildwood, interspersed with the sending of big delegations of competitors to the Harrisburg and Norristown clubs' endurance runs, in the former of which Philadelphia was the over-night stop. The Norristown club's hill-climb was likewise built up around the big nucleus of entries

furnished by Philadelphia dealers and owners, and the Quakers raised such a storm of protest at being sidetracked by the Glidden tour officials that the latter felt constrained to revise their itinerary and make this city an over-night stop.

And finally, to top off an unusually long series of competitive events the Quaker City Motor Club promoted and carried to a brilliant and successful conclusion the founders' week 200-mile stock car race in Fairmount park, which has set a standard in the matters of course-protection and general good management which promoters of similar events all strive to equal, with greater or less success—usually less. And now the Quaker City Motor Club is agog with the preparations for next New Year's run and already the strings are out with a view of securing the requisite permission for another Fairmount park race.

well established houses and a few of the later arrivals surviving.

Gradually, however, with the disappearance of the paper money issued by the clearing houses and the return of confidence, things began to brighten, and before the summer was well along the motor car market was very appreciably improved. The business of the various houses, while not, perhaps, approaching the heavy volume of the previous season, was still sufficient to float the agents along very comfortably, and in some instances cars that have won popular favor have not been obtainable in sufficiently large quantities to meet the demand. For example, Charles S. Howard, the local representative of the Buick car, has been at the factory at Flint, Mich., for several weeks trying to get some more cars for his territory. Finding telegrams availed him nothing, he packed up and went east with the determination to camp right at the factory until he got what he wanted. Meanwhile the floor of his salesroom here is practically empty, and of the particular model that he wants he cannot get enough.

Scramble to Fill Orders

Other local agents have found themselves practically in the same position. The few companies that had their 1909 models to show 2 or 3 months ago reaped a harvest, while those whose cars arrived late suffered accordingly. Many of them, however, with well known cars, accumulated a goodly number of orders, and they are now filling these from the shipments that are coming through. California, differing from many sections of the country, is a year-around state. There never is a week that motoring is not pleasant, and for business purposes the motor car is used every day in the year. This is especially true in San Francisco, where the transportation companies have not yet entirely straightened themselves out after the disaster, and getting about rapidly is consequently still a little slow. Motor car buying in California, therefore, never stops for weather reasons. The coming season certainly will be no exception. The reports of the motor vehicle department of the secretary of state's office show that from December 1, 1907, to the same date this year almost 5,500 individual motor vehicle licenses were issued. This record, however, will undoubtedly be far surpassed in the next 12 months.

Fine New Buildings

The great fire of 1906 destroyed every motor car salesroom in the city. Since that time practically every dealer in the city has had his salesroom in some kind of a temporary shack, paying exorbitant rates of insurance and constantly in dread of fires, several having been wiped out by flames. This situation is now being remedied rapidly. The Winton Motor Carriage Co., when it established a branch here a year ago, put up a handsome brick and concrete building on beautiful Van Ness avenue which not only houses its own

Golden State Outlook Enthuses Dealers on Coast

By W. H. B. Fowler

SAN FRANCISCO, CAL., Dec. 26—"The past season, though a trying one at the beginning, has in the end been one of the best in the history of the motor car industry in California. The season that we are just about to open will, in my opinion, surpass anything that we have ever had out here. It is going to be a record-breaker."

This brief summary, made by one of the prominent motor car agents of this city, gives a good picture of the situation in this state; in fact, it may be applied truthfully to the whole Pacific coast, if reports brought to this city by the general traveling representatives of the manufacturers are correct. Never before has the outlook in this state been brighter for the motor car men. The financial stress has passed away, and money appears to be plentiful, although it is still true people are holding onto it a little nervously. The peculiarly local conditions affecting San Francisco as a result of the great disaster of 1906 are rapidly straightening themselves out; merchants and business men now know where they stand, and are able to judge their affairs accordingly. The agriculturists of the state, and its horticulturists, are much happier than they were a year ago, for the rains have come that were lacking then. The prosperity of these two great industries of the Golden state mean the prosperity of all. And, too, the prosperity of the farmer and the fruit man and the man of the country generally assumes an importance this year that it has never had before. The reason for this is the introduction into the motor car market of the new brands of low-priced cars, which will be turned out by the thousands, and which must in the nature of things

find a good part of their market in the country. So far as California is concerned, there seems to be no doubt but that the country will do what is expected of it, and maybe demand more than the manufacturers can supply.

Year a Healthful One

All things considered, the past year has been an excellent one for the motor car men of this city and state. The start was bad indeed, for the financial depression that put itself like a pall over the country in the fall of 1907 affected California no less than it did the east and middle west. Perhaps, indeed, the effects were felt a little more out here because of local conditions. San Francisco was just pulling itself out of the disaster of 1906 when in May, 1907, came the great street-car strike, which resulted in the temporary destruction of San Francisco's retail business. Just as this was settled and business was resuming its normal course, there came the financial crash that shut the motor car market down as tight as a drum. Those were bad days for the agents who did not have the strongest financial backing, and it was not long before a dozen or more of them closed their doors, some of them able to pay their bills first and some of them not. It was a weeding out of the mushroom firms, with the old and

STATISTICS FROM SAN FRANCISCO

Cars sold in California.....	5,500
Number of branch houses in city.....	8
Number of motor car dealers.....	26
Number of makes of cars represented.....	36
Number of tire agencies.....	14
Number of supply houses.....	10

branches, but also two other motor car firms and a tire house. This building cost about \$65,000. The White company is now erecting what will undoubtedly be one of the finest garages and salesrooms in the city. It covers a large area, with two stories, and will cost more than \$125,000. The Studebaker Brothers Co., of California, has erected in the general wholesale district of the city a seven-story building that must represent an investment of a third of a million. Only a part of it is given over to the motor car business, but still no unimportant part. Studebaker Brothers handle cars like they do buggies, and the stock on the floor of their salesroom is a complete show in itself.

The Franklin and Pope-Hartford agencies, the Fisk Rubber Co., the Renault, the Oakland Motor Car Co., the Winton and the Diamond Rubber Co. are all now housed in permanent structures, and contracts have been let for several other fire-proof buildings, each one of which will house two or three or more motor firms. The building of the Diamond Rubber Co., in the down-town wholesale district not far from the Studebaker house, is an enormous place, representing a very large investment. In another year the agencies will practically all be housed in suitable permanent buildings.

Foreign Car Succeeds

An interesting feature of the San Francisco market has been the success scored by the only foreign car represented here. This is the Renault. A branch was installed here just about a year ago by Paul Lacroix, head of the firm in the United States, and left in charge of a young French ex-army officer, Rene Marx. During that time the branch has sold more than a dozen of the high-grade foreign machine, the purchasers being numbered among the wealthy men and women of the city. In some cases the car has been purchased here and delivery taken in Paris, the new owners touring the continent before returning here. A taximeter cab company has been organized which has already contracted for a number of Renault taxicabs, and it is understood that these will be in actual service within a month. San Francisco at the present time has no taxicab service, and there seems to be no doubt that if the financiers of the project can see their way clear to impose moderate charges, the little cabs will be immensely popular here. Another taxicab company, it is understood, is also in course of organization which plans to use the Thomas taxicab.

Commercial Situation Slow

In San Francisco the commercial motor car has not made very great strides. For the past few years, since the disaster of 1906, the condition of the streets has been somewhat against it, and then the somewhat hilly character of the city has influenced merchants in favor of the ever-reliable horse. There are, however, not a few light motor delivery wagons, and

during the past few weeks two or three of the great Packard trucks have been sold in this city. Neither has the electric found a very large market. In San Francisco it is practically unknown, but in the fashionable residence districts across the bay and down the peninsula there are a few. In San Francisco they are never likely to be popular because of the heavy grades.

Another Show Probable

It seems quite probable at the present time that there will be a motor car show early next year. The first show, given 2 years ago, was a great success, and the enormous Coliseum was crowded day and night for a week. This year, owing to a disagreement among the members of the dealers' association, only half of the dealers of the city were represented, but at that those who did show their cars declared that they were well repaid for their efforts. The matter has already come before the dealers' association, but no definite decision has been reached, the dealers fearing that if it is announced that there is to be a show, prospective buyers will lay back and wait for the exhibition before putting in their orders, and business will be delayed just so much. If the local agents decide to have the show, they will spring it on the unsuspecting public about 2 or 3 weeks before the date chosen. The date favored is toward the end of February. If, however, there should be

no general show, there will doubtless be an open house week, during which the various agencies will have little shows of their own in their own salesrooms.

The motor contests of the past year about San Francisco have been numerous, but not sensational. The conservative Automobile Club of California has given an endurance run or two, but the entry has been very small. The Automobile Dealers' Association also has given some endurance runs, but here again the number of entrants has been very limited. The most notable effort was the 24-hour run in Alameda county, which brought out a dozen or more cars. There appears to be a regrettable lack of harmony among the dealers of the city, and the various contests and other affairs that thrive in mostly every large center of the United States, serving to secure publicity for the game, are not very thoroughly supported here. The San Francisco Motor Club, recently formed, is a non-partisan organization, and through its efforts more successful runs and contests may be carried out. Most popular of all forms of contests here is the track meet. Two of these have been held close to San Francisco during the past few months, and each has drawn a crowd of some 8,000 people. Half a dozen cities close around the bay have had similar meets and have drawn large crowds. The feeling against track racing here is only an echo of eastern opinion.

Business in the Hub Surprise to Many Tradesmen

By J. T. Sullivan

BOSTON, MASS., Dec. 28—When statistics are given out dealing with motor cars and the motor industry they run into large figures. Sometimes these are really surprising, and it takes much argument to convince the ordinary person and even then with facts and figures there still remains an air of doubt. So when it is said that during the past year—allowing a little more than since the first of January, of course; or to go back to the beginning of the 1908 selling season—that some 3,500 cars were sold in Boston ag-

gregating something like \$7,000,000, placing the average at \$2,000 a car, the statement is apt to meet with skepticism. Yet that seems to be a reasonable, conservative estimate. Of course, no one expects that each dealer in Boston is going to tell just how many cars he sold. In fact, this air of mystery which surrounds the sales of motor cars is one of the novel things connected with the business. However, there is a way of striking averages which may give some idea of the sales. When it is considered that something like seventy cars were represented in Boston during the year, that would mean an average of fifty cars sold by each dealer. To note the registrations at the office of the highway commission it does not take very long to find that number of cars for a great many makes.

17,000 Cars Registered

There are 17,000 cars registered in the state. Allow 3,000 as being reregistrations of one owner to another and there is left 14,000. Cut the latter number in two and grant that 7,000 are machines owned by

STATISTICS FROM BOSTON

Estimated capital invested	\$10,000,000
Total sales in 1908	\$ 7,000,000
Cars sold	3,500
Makes represented	65
Agencies	31
Branches	14
New branches opened	1
New agencies	8
Branches discontinued	1
Agencies discontinued	13
Taxicabs running	75
Supply houses	52
Miscellaneous concerns	45
Garages	20



men a year ago; that leaves another 7,000 as being approximately new cars bought within a year. Now there are nearly 3,000,000 people in the Bay state and of that number more than one-third may be found within a few miles of Boston. The eastern portion of the state is, of course, the more thickly settled, so the statement is not too broad to claim that two-thirds of the people live within a radius of 25 miles of the Hub. Is it too much then to claim that half of the motor cars sold in the state were delivered by Boston dealers? Certainly not. So there you have your figures as near an estimate as may be secured without delving into everyone's personal affairs.

Sixty-five Makes Represented

There are now in Boston representatives of about sixty-five motor cars. Of these fourteen are branches, while the other fifty-one are represented by thirty-one agents selling on commission, some having two or three cars. All things considered the past year was not a very bad one despite the cry of panic and hard times. There were not so many changes when it is considered that there are so many agencies in Boston. The new cars that came here were not numerous, and those that dropped out or changed hands did not create any great stir.

When the situation is really analyzed it will be found that the new arrivals balance what changes and withdrawals have been made during the year, leaving the conditions numerically about the same, but the industry in a more healthy condition.

Boston should be a very good field for the electric vehicle. Still, there is not the steady growth in these machines that there should be. The city is level, the streets are well kept; there are plenty of places to get batteries recharged, yet the number of electrics seen on the streets is not enough to make one accustomed to seeing them. There are agencies here for the Studebaker, Columbia, Babcock, Baker, Bailey and Columbus and more attention is being given to their sale now, so something may result in the way of increased sales.

The Commercial Situation

Commercially, Boston is taking kindly to the horseless vehicle. To stand now and watch traffic in any one of the busy streets will show an entirely different scene than was presented a year ago. There are all sorts of commercial vehicles in use now. Caterers, florists, hospitals, express companies, furniture men, dry goods stores, banks and even a large undertaking company has within a few weeks joined the list, to say nothing of the dozens of trucks now used by the Edison Electric Co. and

the New England Telephone Co. It makes a really striking array and speaks well for the men who have been selling these vehicles. There are represented here, among others, the Rapid, Logan, Knox, Maxwell, Packard, Frayer-Miller, and within a short time there will be some more new ones.

The one thing in the industry that has attracted attention in this city above all else recently is the taxicab service. Beginning with a couple of cabs put in some months ago by E. P. Blake, of the Jackson, there suddenly came into being during the summer companies using dozens of the little vehicles. One of the companies put in a lot of Thomas cabs, and the other put in Berliets. There were also put in some Atlas cabs. Then some of the cabmen purchased one, two or three to make some sort of a showing as they saw their trade falling off. So now there are perhaps about seventy-five of them in the city and the end is not yet. Whether the taxicab business will be overdone is a question that some of the men who have followed the motor game for years are wondering at now. The city is not large and it does not take long to cover it from north to south and east to west, and with a system of tunnels it is easy to make connections in a short time, so with too many of the taxicabs there is apt to be a falling off in receipts. They will be patronized much for some time because of the novelty, naturally, but eventually they will get down to a basis where the dividends on the capital invested may not be as large as expected.

Million Invested in Real Estate

There is more than \$1,000,000 invested in the real estate that houses the motor car agencies alone, not to mention all the buildings now occupied by men affiliated with the industry in the repairing, tires and accessory line. Some of these buildings were constructed especially for the motor industry. There is, for example, the Motor Mart in Park square, in which are housed the Packard, Cadillac, Marmon, American, Buick, Chadwick, Speedwell and a number of other cars. It is a large circular structure right at the very door of the trade, being a sort of a hub from which the spokes go to the west. The greater number of garages is within a section 1 mile long by $\frac{1}{4}$ mile wide. These buildings, it must be understood, were not all erected during the past year, but as this is perhaps the first comprehensive review of conditions in Boston it is not out of place to mention them.

Naturally with so many cars in Boston, and all New England to draw upon practically, the tire branches here are more than mere small stores for selling a few sizes. Each concern has an up-to-date branch where all the sizes are kept in stock ready to be sold or shipped quickly anywhere. This means very large quarters, of course. The Diamond, Goodrich,

Goodyear, Firestone, Fisk, Morgan & Wright, Continental, Hartford, Dunlop and G & J have long been established here. The Michelin, Dow and Federal are newcomers in the fold here.

It is not to be wondered at that the accessory people are very strongly entrenched in Boston. All the speedometers are represented; Gray & Davis have just established a Boston office for lamps; the many kinds of shock absorbers have their own representatives, until the owner of a motor car may purchase anything needed and without being forced to go to any one place and held down to one article of some accessory. With all these affiliated branches counted in it proves there are millions in the motor industry in this city alone, just how many is problematical, but \$10,000,000 does not seem an excessive figure.

As a finale here are some figures revealed by a glance through the new Boston directory issued a couple of months ago. Under miscellaneous headings such as castings, bodies, tops, generators, grease, oil, lamps, etc., there are some forty-five firms listed. Yet this did not include all of them. Under the heading "Motor Car Supplies" there are just fifty-two companies named. For garages there are twenty given. Under the heading "Motor Car Dealers" there are 102. This included duplicates, of course, giving an agency name, for instance, and in another line the name of the manager of the agency. So when it is considered that Boston is but one city in New England, and that other cities in the six states are doing very well in the motor industry, though on relatively smaller scales, some idea may be gleaned as to what a valuable asset this territory is to the makers of motor cars.

There is another side to the motoring besides selling the cars and using them; an end that is an important factor in keeping the interest up—that is the competitions in the way of sports. In Boston the dealers are fortunate to have some energetic men who give freely of their time to keep alive the sporting interest, and these men may be found on the rolls of the Bay State A. A. While this organization may be given credit for the successful contests it has held during the year, it would be nearer the truth to state that its officers and the local dealers are deserving of the praise. The club has a large membership, but many of the men visit the club but once or twice a year, and some not as often.

Three Big Competitions

Coming down to what was done under the auspices of the club, three events stand out prominently. The first was an endurance run held on February 22. The rules were very good ones and there were



twenty cars entered. The distance was 135 miles. As a sort of change the club held a series of track races at Readville on June 17. Track racing has been expected by the public for some year here and it was thought best not to disappoint the lovers of that sport. Although May 30 was originally selected, the postponed date brought out a good crowd and there was some good sport. For a fall event there was held an endurance run that has gone down into history as one of the great events of motor competition. It began with a 24-hour, 200-mile non-motor-stop run, and ended when three cars were still going after making six trips and the mileage had run up to more than 1,600. This competition began on September 24 with twenty-one starters. Ten came back without penalization and then began the elimination. Some of the clean score cars did not enter the run off, and after a couple of more trips there were left a

Studebaker, Franklin and Shawmut. These three fought it out in all kinds of weather, day and night, until it was finally decided to call it off, October 3, without a winner.

Bay State Club Moves

The Bay State club moved during the latter part of the summer from its old home on Dartmouth street, and now it is in the Hotel Carleton, where it has a handsome suite of rooms. It seems to be getting more popular now, too, and is growing with great rapidity.

As an evidence that the motor industry is a big factor in public affairs in New England was proven when one of the sessions of the recent conference held by the governors and governors-elect of New England, at Boston, was devoted to motor cars and highways. A full account of it was published in Motor Age, issue of December 3.



cers of the concern. In 1900 the Thomas factory occupied one floor and gave employment to eighty men, which included the office force. In that year the company spent \$40,000 in the way of salaries, material and advertising, while a scrutiny of the books at the end of 1908 shows that 1,400 people were employed and that the total disbursements for the year reached \$2,315,367.14. In 1900 seventy-five cars were made and in 1908 950 completed Thomas cars were sold.

Buffalo has not been very strong on taking up the commercial proposition, although it has the streets. But it looks now as if next year there would be a big change. The Chase Motor Truck Co., of Syracuse, N. Y., is preparing to invade the field.

The Babcock electric, which is manufactured here, seems to have the call in its particular line and its wares are meeting with a ready sale in this city. As mentioned before, the streets here are admirably adapted to the electric and the army of users of this type is constantly growing.

What Buffalo Club Has Done

A review of the situation in Buffalo for the year just past and a glance into the coming season would be incomplete without a word of the organization which has been the mainstay in making Buffalo the motorizing center it now is—the Automobile Club of Buffalo. This organization now has a membership of 1,510, with more being added each month, and membership in the club now takes its members into Canada free of any bond.

One of the greatest enterprises to be attempted by an organization of its kind has just been advanced by this club, that of the Buffalo-Niagara Falls boulevard, which already has begun to take definite shape and bids fair to become a reality within a few years.

The enterprise, when completed, will owe its first inspiration to the Automobile Club of Buffalo. The plan is to build a boulevard, extending along the Niagara river frontier from Buffalo to Niagara Falls, a distance of 25 miles, which may be used as a speedway for Buffalo motorists.

These are not fallacies thrown together to boost a stagnant organization, but facts regarding what a good, live association has accomplished for Buffalo. At a meeting this month, the following officers of the Buffalo Automobile Club were elected and extensive plans for a big year in 1909 are already under way: President, John M. Satterfield; vice-president, Laurens Enos; treasurer, Harry Throp Vars; secretary, Dai H. Lewis; board of directors, Charles Clifton, E. R. Thomas, E. H. Butler, George C. Diehl, James N. Byers, Maurice M. Wall and George P. Urban.

Buffalo Is Satisfied With the Past Year

By Joseph A. McGuire

BUFFALO, N. Y., Dec. 28—The Bisons are winding up the old year and starting in the new very well satisfied with themselves and the state of their various businesses. Despite the panic earlier in the season, it has been a good year for everyone concerned. It is impossible of course to get a correct line on the number of cars sold, but a mighty shrewd guess would be around 800, not counting the wholesale business done by the Thomas and Pierce-Arrow factories.

Buffalo has twenty-one concerns in all handling motor cars, three of which are branches. That each attends pretty well to his own knitting is shown by the fact that the twenty-one handle twenty-five different makes of cars. There are twelve tire agencies in the city and there are eight supply houses doing business. In the way of public garages it is worthy of note that there are twenty-five of them, all doing well. It also is noteworthy that many of the owners are building their own garages and that these private establishments are becoming almost as numerous as were barns in the days when the horse was king. There was great activity in these lines last summer and the indications point to still more of them being built during 1909.

Pierce Working Big Force

Both Buffalo's big factories, the Pierce and the Thomas, are flourishing. The new

STATISTICS FROM BUFFALO

Approximate number of cars sold...	800
Number of branch houses.....	3
Number of motor car dealers.....	18
Number of makers of cars represented	25
Number of tire agencies.....	12
Number of supply houses.....	8
Number of principal garages in Buffalo	25

steel and concrete plant of the Pierce company is now running at its full capacity, employing 10 per cent more men than ever before. Heretofore the Pierce people have been content with manufacturing not more than two models in any one year, but for 1909 it will have five. There are not fewer than six different kinds of bodies for each model, so there are more than thirty different styles of Pierces for the new year. It is reported at the factory that it would be possible to dispose of from 35 to 40 per cent more cars next year than the factory can handle, this being discovered by the applications of the dealers for larger allotments. During the past year the local Pierce branch sold more than 100 new and used cars in the Buffalo territory.

Growth of Thomas Company

The Thomas people are preparing to double their 1908 output, they declaring that the prospects are of the brightest. They say the demand for high-priced cars is surprising and they expect to be put to their limit to meet the call for their cars. An idea of the growth of the Thomas company may be had by a comparison of figures given out today by offi-



Spring Trade Late in Toledo

By H. L. Spohn

TOLEDO, O., Dec. 27—Considering all the circumstances surrounding the motor car business the past year has been something of a surprise to most of the dealers in this vicinity. Business opened unusually late last spring and in the midst of a financial depression which was showing telling effect on all kinds of trade, and it was a discouraging prospect for the year's business. Few expected that the volume of trade would approach anything like what has developed. Business has recently picked up to such an extent that it has caused no end of comment, and predictions now place next year's business at anywhere from 25 to 50 per cent increase, up to at least double that of this season. Heretofore the demand for cars never began before February or March, and last spring there was practically no call until as late as April. This fall Toledo dealers have booked dozens of orders for 1909 cars already, and inquiries are apparently as numerous as in midsummer. The chief difficulty seems to be to secure the cars to fill the orders, most of which are for immediate shipment.

Bright Prospects Ahead

Many dealers report that they have already taken orders for more business for 1909 than the entire volume of their 1908 trade. Those familiar with the business make no hesitation in predicting that next year will prove a record-breaker.

While it is an easy matter to secure optimistic reports at any time, as most any dealer will in a general way boost the trade by an encouraging statement, there can be no question of the present condition. Dealers make no secret of their business in this connection, and willingly disclose their signed orders on 1909 models, which must dispel all doubt. Some have openly published the names and addresses of recent customers, for investigation, and the claims set out seem to be thoroughly substantiated.

Since election there has been an altogether different atmosphere in local financial circles, and this restoration of confidence is in large measure responsible for the present splendid prospect, as well as for the recent phenomenal business. Many men of means, who have for months put off the placing of their orders because of the unsettled condition have placed them as soon as they could get around to it after election.

Fifteen Agencies in Toledo

In Toledo there are fifteen motor car salesrooms, three branches and sixteen garages. With one exception there are no tire agencies, the exception being the Acme Rubber Co., which handles the Continental

STATISTICS FROM TOLEDO

Number of cars sold.....	1,000
Number of car agencies.....	15
Number of branches.....	3
Number of garages.....	16
Number of tire agencies.....	1

tires in this territory. During the year there have been five new agency offices opened, while two have withdrawn. The new agencies that have been taken on during the past year are the American, by Herbert Lytle; the E-M-F and Studebaker and Columbus electrics, by Kirk Brothers; the Babcock electric, by F. B. Smith; the Chalmers-Detroit, by B. O. Gamble; the Overland, by A. A. Atwood; the Kisselkar, the Detroit electric, by the Twenty-first street garage; the Winton, by Louis Lichie; the Stevens-Duryea, by the Union Supply Co., and the Woods electric, by Frank Collins.

Changes in Toledo

During the same period of time the Atwood Automobile Co. has given up the Franklin and Jackson lines. The Buick has established its branch office here, superseding the handling of the car by the Kirk Auto Co. The Central Carriage and Automobile Co. has given up the Auburn line and Kirk Brothers Automobile Co. has given up the Detroit and Woods electrics. The Toledo Motor Car Co. has been bought out by the Gamble Motor Car Co., which company has given up the Oldsmobile and Winton cars prior to taking on the Chalmers-Detroit line.

In and around Toledo there have been nearly 1,000 cars sold during the past year. Owing to the fact that so many of the local agencies and garages are rented in Toledo, it is hard to figure just how much money is invested in the industry in this territory.

So far as the commercial car is concerned there has been little if anything doing up to the present time. But Toledo merchants are beginning to realize what a vast field this industry represents and within a very short period of time there is unquestionably going to be a great deal of activity in the commercial end of the industry. The market is here and all that is necessary now is for some enterprising man to show the people just what the possibilities of commercial cars are.

Under the auspices of the Toledo Times, a most successful 3-days' endurance run was held in September from Toledo to Columbus, to Cleveland, to Toledo, and this run, which was held under splendid conditions, left nothing but the best of feelings among the local dealers and has brought them all closer together.

STATISTICS FROM WORCESTER

Approximate capital invested.....	\$1,000,000
Number of motor car dealers.....	14
Number of makes represented.....	25
Number of cars sold.....	314
Number of tire agencies.....	4
Number of supply houses.....	2

Business Doubled in Worcester

By H. L. Hanlon

WORCESTER, MASS., Dec. 26—The season of 1908 in this city from the pleasure vehicle standpoint has been a remarkably successful one. About 314 cars have been sold by the local trade. All were pleasure vehicles. This is nearly double the number of cars sold here in the 1907 season and the dealers, one and all, look for as big an increase in the sales next season as there was this season over last.

There have been several changes in the personnel of the motor car dealers in Worcester and the cars they will handle the coming season. The Maxwell branch has been discontinued. John S. Harrington has withdrawn from Harrington's station No. 1, and the Macker-Tyler Co. has given up that name and now uses simply the firm name. Young Harrington has gone into business for himself also, having a part interest in the new firm of L. W. Locke & Co.

Outlook in Worcester

While the outlook for the pleasure cars in Worcester is extremely bright, that for the commercial motor cars and electric vehicles is very poor. There are not more than a dozen, if there are that many, business rigs seen upon the streets of Worcester. There are hardly that number of electric cars. Only a very few of the owners or managers of Worcester multi-varied industries have been convinced of the superiority of the motor-driven vehicle over the horse-drawn kind. The fact that there are no agencies for commercial trucks in Worcester may be one reason why they remain unconvinced. But it is a fact that when those who now use motor trucks and swear by them got interested in them, that interest was of the self-engendered kind. There will be no changes in the tire agencies this year.

Club Is Prospering

When Worcester went no-license last December it was freely predicted that the membership of the Worcester Automobile Club, or rather that portion of the membership enjoying the social privileges only would rapidly fall away. But such has not been the case. The club has flourished and the membership has increased to such an extent that the officials are seriously considering new quarters.

The club has conducted a successful and paying venture in the annual Dead Horse hill-climb in which a steam car for the first time wrested the time record from the gasoline type on Dead Horse hill. The club also had a most successful orphans' day outing and besides several delightful club runs, wound up the year by conducting a grueling 210-mile reliability run on December 12, won by the Franklin.

Kansas City Artery for Southwest

By P. A. Sutermeister

KANSAS CITY, MO., Dec. 27—While the season of 1908 in Kansas City's motor car industry will be recorded as the largest that this southwestern trade center and distributing point ever has enjoyed, 1909, from the preparations now visible on every hand, will outstrip the totals here given by a big margin. The figures presented include sales made by local agents and branches. As some of the branches have three states and more to draw from and nearly every dealer has western Missouri, eastern Kansas and perhaps a slice of Oklahoma, it readily can be seen that the record of Kansas City is the record of the most prosperous section of the southwest.

As concerns the city trade itself, the most noteworthy feature, outside the big increase in agencies and the establishment of new motor car branches, has been the increase in tire depots, practically all of which are factory branches. Ten concerns are represented, all but two with a separate place of business. Outside of eight branches, there are now fifteen salesrooms for motor cars, not counting several which are to be constructed before spring. These new motor car agencies have been established during the year: Brush-Overland Co., Moon Motor Car Co., Dey Motor Car Co., Tebeau Motor Car Co., Pioneer Motor Car Co., Velie Motor Car Co., Kiblinger Auto Buggy Co., branch; Great Western Automobile Co., branch; Rambler, branch; Kansas City Taxicab Co., Franklin Motor Car Co.

Of the concerns those who were agents, but who now are doing a garage business are the Palace Auto Co. and Richter Brothers. Altogether, there are now twenty-four garages, including livery services and factory branches.

Value of Buildings

As noted above, much of the work which has been planned in the way of buildings this year has been delayed because of leases held by present tenants, who did not vacate when the garage men expected them to do so. So, while the total for buildings may be conservatively set at \$150,000 for the year, this takes no account of the structures now contemplated or in course of construction, except as the last named would be valued in their unfinished state at the present writing. Properly speaking, there are few buildings in use as garages which were built with that purpose in view. A majority of the agents occupy remodeled stores.

That buildings have less to do with sales than goods, however, is proved by the fact that the year's total shows a motor car business of \$3,000,000, representing about 2,800 cars. These are not claims which

STATISTICS FROM KANSAS CITY

Capital invested	\$ 500,000
Approximate number of cars sold, including wholesale business	2,800
Approximate cash value of same	\$3,000,000
Number of branch houses	8
Number of agencies	19
Number makes of cars represented	45
Number of tire agencies	10
Number of supply houses	3
Total tire business for year ..	\$ 400,000

overstate the facts, nor are they, in a number of cases, the estimates made by dealers themselves on their business. If they are not absolutely accurate, they err on the score of being too small. According to the best obtainable information, they represent what actually was done in 1908, or rather, up to December 15, 1908.

Electrics Make Good

Once upon a time there was a belief that electric cars would not make good in a hilly town. Perhaps that statement was true in the case of the first electrics. But the Kansas City sales of that type of motor car in 1908 have almost placed the electric where it belongs. There are now some forty electrics in every-day use in Kansas City, giving good service, and their numbers are constantly on the increase. One charging station in the fashionable district has accommodations for twenty cars at a time. It was first equipped to handle only six and now, after half a year, it finds itself cramped for room.

It has taken commercial vehicles a long time to get over the bad impression the first of such cars created. That this notion was due more to faulty handling is plain to be seen, for some of the old wagons, disposed of in disgust by their earlier users, are doing good service now in more painstaking hands.

Commercial Rig Outlook

As compared with the strides made by the motor car in other fields, however, it is behind in the commercial way in Kansas City. Just at present, electric delivery wagons and trucks are finding the most favor and if they keep up the satisfactory showing they have made this fall, there is no doubt their adoption by many firms quickly will follow. This conclusion may be urged more strongly in view of the fact that most of the heavy hauls are likewise long ones, a condition which shows the motor truck to best advantage.

STATISTICS FROM CLEVELAND

Capital invested	\$8,750,000
Cars sold	490
Motor car factories	9
Accessory manufacturers	3
Agencies	20
Branches	9
Sold from factory	2
Makes represented	38
Accessories depots	16
Tire concerns	12
New branches opened	2
New agencies opened	5
Agencies discontinued	2

Cleveland Is Proud of a Big Year

By Henry H. Hower

CLEVELAND, O., Dec. 28—Buffeted by adverse financial conditions, facing dismal prophecies of failures and panic prices to come and worried by the cancellation of conditional orders, the motor car business in this city has come through the past year in a manner second to none in the country. Not only did the concerns in business, with two minor exceptions, come through with colors flying high, but they were joined by seven new-comers, giving this city a total of twenty agencies, nine branch houses and two factories selling direct. Seven new cars have been taken on, while but two have been dropped—altogether a rather remarkable showing. Scenes have shifted rapidly on the motor stage in this city during the 12 months now closing. Cars have been changed from one agent to another in some cases, new agencies opened up, branch houses made their appearance, and with old 1908 about to close its record book the industry is now in a healthy condition, viewed from any angle.

Only Two Failures

But two failures of agencies blot the 1908 record—and one of those was foreseen months in advance. The other had no effect upon the business, as the car was quickly taken up and kept in the lime-light. The Ohio Motor Car Co., having no car to sell, and with a heavy overhead expense, went to the wall in the early fall. Part of the building was taken by the Maxwell branch, while the Detroit electric is also handled in the same rooms. The Wolf Motor Car Co., Jackson agent, failed last summer, the car now being sold by the Crawford Motor Co. a new concern. The Metropolitan Motor Car Co., Pierce and Knox agent, is out of business, but quit with its balance easily on the right side of the ledger. The large building occupied by it on East Nineteenth street has now been taken by the Studebaker company, the Ohio branch now having its headquarters there.

New Concerns Represented

To offset this, Cleveland offers its record of "new business" brought into the field. Two concerns—the Buick and Maxwell—realizing the richness of the Cleveland field, have established branch houses, while in addition to the Crawford Motor Co., mentioned above, Charles B. Shanks has opened an agency for Chalmers-Detroit and Stearns cars, and the Barger Automobile Co. organized and has taken the Cadillac. The Auto Repair Co., another newcomer, has the local agency for the Detroit-made Regal, while the Thornton & Brotz Hardware Co. now sells the Pull-

man. The E-M-F in this field is being sold by the Studebaker interests. A number of minor changes have been made in the way of the opening and closing of small accessory and repair shops, but nothing of consequence.

While in an absolutely normal year the sales would undoubtedly be much heavier, nevertheless Cleveland dealers and agents this year in this city alone disposed of about 490 machines. This figure represents the cars sold in the city and its immediate suburbs only. The majority of local agents and branch houses have a great deal of territory in this part of the state, and it is safe to say that between 950 and 1,000 cars have been handled by Cleveland dealers, all territory being considered.

Commercial Car Prospects

In one way Cleveland is a rather queer field for motor cars. For pleasure vehicles, both gasoline and electric, the territory is in good shape, but an odd condition prevails regarding the commercial car. Many Cleveland merchants have given the proposition some thought and possibly a little study, but on all sides there is a manifest disinclination to make any definite move. Everyone is waiting to see what others are going to do, and someone or something is needed to give the commercial movement a good, strong impetus. Once safely started there is little doubt but that it will continue with constantly increasing momentum. At this time, however, while several standard trucks are represented here, it is well-nigh impossible for the dealers to break the ice. Some forty machines only are in use here—a poor enough showing for a city the size of Cleveland, and one which boasts nine motor car factories. The latter fact is probably one of the things which has kept the business on such a firm foundation in this city. Clevelander, even those who have but a superficial knowledge of the motor car, know that this city is a recognized center, and they also know that millions are invested in the business here. Trips to and through such plants as house the Winton, White, Stearns, Peerless, Royal and Gaeth, with the Baker, Rauch & Lang, and Byrider electric factories added, has a startling effect upon the layman. Between eight and nine million dollars is represented in this city in motor car factory buildings, assets, etc. A great deal of building has been going on the past year, over \$200,000 having been spent for additional factory room only. This does not include the thirty-odd thousand that has been expended for new branch and agencies buildings, improvements, etc.

Capital Invested in Business

Close examination shows that in addition to the sums given above, in the neighborhood of \$260,000 is invested in buildings erected and equipped for the sole purpose of carrying on retail work, including,

of course, repair, charging and general garage work. At first glance these figures appear rather large, but inspection bears them out in every detail.

The Year in Sports

The sport has not received as much attention this year as it should. Two endurance runs and one hill-climb constituted all the fun or sport. One of the endurance contests was the Toledo event, in which a large number of local dealers were interested, while the other was the Cleveland endurance event. The hill-climb,

held in June, also was strictly a local event. The show, held in February, was one of the most successful ever held here in the point of attendance, although buying was not so noticeable, owing to the then unsettled conditions. Every dealer, however, who exhibited at the show, appeared well satisfied with the results obtained. Summed up briefly, the 1908 season starting with the gloomiest of prospects, has wound up in excellent shape, considering what "might have been," and everyone is satisfied.

High Grades Sell Well in Washington, D. C.

By H. G. Ward

WASHINGTON, D. C., Dec. 28—There are a number of things that serve to make the year 1908 the most remarkable in the history of the local trade. While the number of cars sold probably was not as great as during the preceding year, the average cost of this year's cars was greater than last year, demonstrating that the demand has been for the higher-priced machines. Another striking feature of the year's progress was the unusual number of new agencies that were placed during the year, and especially during the latter part of the present season. Sixteen different makes of cars that have not heretofore been represented on this market were placed with different dealers during the year, as follows: Matheson and Oldsmobile, Pope Automobile Co. of Washington; Brush and Oakland, Brush-Nichols Co.; Stoddard-Dayton and Babcock, L. P. Dorsett Co.; Lozier and Detroit, Dupont garage; Woods, H. Carnell Wilson & Brother; Overland, Dewey garage; Premier, Lester D. Moore, Jr.; Chalmers-Detroit, Motor Car Co.; E-M-F, Studebaker, Commercial Automobile and Supply Co.; Regal, George W. Wells. The Luttrell Co. discontinued the Locomobile agency, which was taken by the Belmont garage; the Dupont Garage Co. dropped the Corbin; H. Cornell Wilson & Brother gave up the Elmore agency, which Charles E. Myers took up. This is believed to be about all the changes that occurred during the year.

There are nineteen dealers in the cap-

ital city, who handle forty-one different makes of cars, thirty-four of which are gasoline and seven electric. It is difficult to figure the amount of money invested in buildings for sales rooms, garages, etc., but it has been estimated by men who have some knowledge of values that at least \$2,000,000 is invested in the motor car business and its allied branches in this city.

Electrics Hold Their Own

Electric vehicles about held their own during the year, although during the fag-end of the season the demand for them was greatly improved. Incidentally, it might be mentioned that 1909 promises to be the best year for electrics that the local trade ever has known.

Commercial cars made great strides during the year and this branch of the business is receiving more and more attention at the hands of the dealers, as they are beginning to realize that commercial cars are reaching a point of perfection that insures them a steady and ever-increasing sale. The federal government is paying a great deal of attention to the commercial car, and the number owned by Uncle Sam has been considerably augmented since the beginning of the year.

New Garages Built

Half a dozen new garages were erected during the year and this branch of business is rapidly getting down to a more solid business basis. In former years the garage business was deemed a losing venture in Washington, but this was largely due to the fact that the business was not watched closely enough. There were numerous drains that served to swallow up the profits, but this condition of affairs is being rapidly improved and the garage business may now be said to be on a pretty good basis.

Taxicabs were placed here for the first time this year and they leaped into instant favor. At least a hundred of them are now plying the streets. Two fine gar-

STATISTICS FROM WASHINGTON

Number of motor car dealers.....	19
Makes of gasoline cars represented	34
Makes of electrics represented....	7
Approximate number of cars sold in 1908	275
Number of tire agencies.....	10
Number of supply houses.....	2
Number of dealers handling supplies	6
Approximate capital invested in all branches of industry, including garages	\$2,000,000

ages have been erected for them in addition to several old ones, and the taxicab business is rapidly reaching large proportions.

The only motoring contest of any importance held here during the year was a reliability contest for a trophy offered by a local newspaper and run under the

auspices of the Automobile Club of Washington. The contest took place June 9, and of the sixteen cars that went over the 164-mile course, which took in three states, thirteen of them finished, none, however, with a perfect score. The contest was by long odds the most important and most successful ever held here.

Motor Car Makes Hit Among the Denverites

By C. O. Sprenger

DENVER, COLO., Dec. 27—Name for me a city in the United States of America with a population of 240,000 whose people expended more than two and a quarter million dollars for motor cars during the year 1908, then Denver will take second place in that class. Denver did that, and more. Like with every other modern innovation that means progress and betterment of mankind, Denver has taken hold of the motor car with a vim, and having the wealth behind it, the result is going to be that it will never be distanced in the number of cars that will be used nor in the average value of these cars.

It took 1,550 cars—gasoline, steam and electric motors—to satisfy the demand of its citizens. The number is going to be far greater during 1909, for the great agricultural district, growing greater every year, and the mineral, oil and other resources of the state and the contiguous territory of which Denver is the center, expanding with astonishing rapidity, is going to pour into the banks of this city such a flood of the purchaseable necessity that the business of the motor car dealers here will be an enviable one.

Fifty-eight Makes Represented

Thirty-one agencies of motor cars presented fifty-eight different makes of machines for the choice of the purchasers. These dealers—including two branch houses—sold a total of 1,550 cars for an approximate amount of \$3,250,000. Of the totals Denver alone took two-thirds of the cars and expended seven-tenths of the purchase price. The balance went over the state and to other sections taken care of by the agencies and branches. Of the total of 1,270 gasoline cars sold the price ranged from \$650 to \$8,000. About 36 per cent of the sales were of cars ranging in price from \$1,200 to \$1,500, 18 per cent from \$2,600 to \$3,000, 17½ per cent from \$650 to \$1,000, 8 per cent \$3,100 to \$3,500, 7½ per cent \$1,600 to \$2,000, 6 per cent \$2,100 to \$2,500, 3½ per cent \$3,600 to \$4,000, 2½ per cent \$4,100 to \$4,500, 2 per cent \$4,600 to \$5,000. Denver retained a little better than one-half of the 200 electric motor carriages sold, prices ranging from \$1,700 to \$2,200—the greatest propor-

tion at the latter figure—and about half of the eighty steam cars.

So important has become the industry in this city that dealers have what might be termed centralized the mart. In one section of the city, and the busiest uptown section, and within a radius of four blocks, are located seventeen of the thirty-one salesrooms, and they are fitted up as attractively, invitingly and extravagantly as any in the larger cities of the country. With them are all the three supply houses and the majority of the thirteen tire agencies. The former naturally shared in the local business of the dealers, and they show a total volume of business of about a quarter of a million, and the tire agencies approximately \$100,000 better, for their market extends beyond the confines of the city and the state.

More Than Thirty Garages

The operators and owners of some thirty-odd public garages have each a large force of men steadily kept on the payroll. At these places the majority of the cars are kept, the new private garage at the residence of the owner not having grown very extensively, rather has it been a change of the former horse and carriage house into a garage, and these changes have been numerous, adding much to the health and cleanliness of the residence sections particularly.

While Denver has been a splendid patron of the motor car made in various sections of the country, it is crowding this avenue of progress some by coming in with two factories of its own. One, a gasoline motor car, the Colburn, had its first year of sales this year.

The Fritchie Automobile and Battery Co., one of which recently completed a run from Lincoln, Neb., to Washington, D. C.

STATISTICS FROM DENVER

Capital invested	\$1,500,000
Cars sold in 1908.....	1,550
Number of agencies.....	31
Different makes represented.....	58
Number of tire agencies.....	13
Number of supply houses.....	3
Number of public garages.....	30
Number of factories.....	2

This factory filled orders for sixty-five cars during the year, more than half of which have been delivered to Denverites and the balance distributed from the Atlantic to the Pacific. These two factories show a capital investment of \$300,000, and this added to the monies invested in the agencies, the branches—Studebaker and Ford—the garages, the supply houses, tire agencies and motor car livery establishments, brings the grand total invested in the industry up to a million and a half.

In a young city covering 58 square miles, with 60-odd miles of asphalt paved streets and the same number of miles of macadam and surfaced streets, nothing could make travel by motor car safer or more inviting to the female contingent, and thus it is that the light yet well-built gasoline motor runabout and the electric are very much in evidence, with the popularity, through its many appealing virtues to the feminine taste, leaning strongly to the electric. The patronage for the latter is growing very rapidly indeed; for matter of fact, the year's demand has not been met.

Not Ready For Business Rigs

The realm of the commercial car is not as yet established in this territory. Two very good cars for this use have been here for some time, but the interests expected to patronize it have not as yet awakened to its advantages. The matter is, however, progressing, and with a few more demonstrations of such satisfactory character as made during the recent economy contest this class of car will come into its own.

Motor cars are purchased in Denver for the pleasure to be derived from their ownership as well as for their practical utility, and the sporting end is not overlooked, either. A new era in the latter feature of the industry set in when the Denver Motor Club was organized. This body, now numbering over 300 men full of ginger, occupies commodious quarters in the uptown section. At the daily noonday luncheon are gathered around the board the live ones of the city, and they are always planning some stunt that will strengthen the social end or some contest that will attract the attention of the public to the motor car industry in every way possible.

During the year four outdoor events attracted a total of at least 50,000 people, and every one of them was a success. Decoration day there was held a 320-mile road race. Labor day another race over practically the same course, cut down to 290 miles, with 14½ miles to the lap. July 2, 3 and 4 there was a reliability contest, run to three different towns out of Denver and return each day, a total distance of 508 miles, and everything was sealed. November 7 there was an economy contest to Greeley and return, 112 miles, in which eighteen cars took part. A hill-climb slated for December 12 was called off because of a heavy fall of snow which completely bound up the canyon.

Good Business Ahead, Baltimore Tradesmen Predict

By A. Robert French

BALTIMORE, MD., Dec. 28—In summing up the motor car industry in Baltimore the figures show that there are two factories, seven branch houses, twenty agencies, in addition to these branch houses, all of which represent forty-four makes of cars. There are also three tire concerns, although there are no tire branch houses, most of the agencies being run by the motor car companies, which are also in the storage and repair business. The same may be said of the accessories concerns, there being only two conducted along separate lines.

The factories are the Sinclair-Scott Co., which manufactures the Maryland car, and Carl Spoerer's Sons. The latter just started up during the present year and is making Spoerer cars.

Trade Changes of Year

Among the principal trade changes that may be noted as having taken place during the year are that Callahan, Atkinson & Co. are just at present devoting their time exclusively to the Locomobile. This firm formerly had in addition to the Locomobile the agency for the Pope-Toledo, Pope-Hartford and Pope-Tribune cars. The Pope-Hartford has been taken over by the Southern Auto Co., which also has taken local agency for the Lozier. This company previously was the local representative for the Pierce-Arrow, which is now being handled by the Foss-Hughes company. The Olds Motor Works has established a branch here for the state of Maryland and vicinity with E. L. Leinbach as manager. This car was formerly represented here by French & McCormick, who have since given up business in the local field. The Stoddard-Dayton and Stearns cars are now in the hands of the Stoddard-Dayton Baltimore Auto Co. The Bridge Garage Co. now represents the Cadillac car in this city, which formerly was looked after locally by the Mar-Del Mobile Co. The latter firm has also given up the agency for the Buick. The Zell Motor Car Co. has been in existence about 3 months, being one of the latest formed in this city. This firm has taken on the agencies for the Chalmers-Detroit and Peerless. The Auto and Accessories Mfg. Co. has taken over the business of the Auto Supply and Storage Co., 1416 Madison avenue. The firm has dropped the agency for the Studebaker. The Auto School and Garage has taken on the agency for the Cameron. This concern and the Automobile College of Baltimore afford the opportunity for beginners to take lessons in running motor cars. William

Blome is a newcomer in the local field as representative of the Moon car, while Charles S. Houghton has recently become the Baltimore representative for the Overland. The latest agency placed in the hands of the Motor Car Co. is that for the E-M-F car. The Lambert Automobile Co., which took on the Maxwell car during the present year, has moved from Roland Park to Chase street, between Charles and St. Paul. This brings the firm nearer to the other motor car dealers. The Bolton Auto Co. has the agency for the Regal car. The Mitchell Motor Car Works, in charge of J. P. Shuler, and the Matheson Motor Car Company are also among those to enter the Baltimore field within a year.

In the way of new buildings, it might be said that Callahan, Atkinson & Co. have extended their plant from 1020 Morton street and now occupy the space from 1014 to 1020 Morton street. Including in this addition to the plant are 3,500 square feet of floor space for the storage of cars. The most important building contemplated during the coming year is the handsome new \$50,000 garage to be constructed by the Zell Motor Car Co., which will be on Mount Royal avenue between Charles and St. Paul streets.

Statements by the various dealers and agents in this city show that the motor car business during the past 12 months has been equal if not a little above that of the previous year. There are decidedly more cars on the streets of Baltimore than ever before. This does not mean, however, that the money stringency during the first part of the year did not have a bad effect upon the trade, for it did.

Prospects for 1909

The prospects, too, are for a continuance of this improved condition, and tradesmen are already predicting that the years of 1909 and 1910 will carry off all records by a big margin in the way of sales within the city and state. And there are a number of good reasons for such predictions. During the past year the Maryland legislature passed a \$5,000,000 good roads loan and already routes have been selected for improved highways in most of the counties of the state. The loca-

tion of the routes in the remainder of the counties and the necessary surveying work will be completed by early spring when the actual work of road construction will be started. The final result will be a system of good roads extending from one end of the state to the other and on both sides of the Chesapeake bay. This scheme will also mean the final abolishment of all toll roads in Maryland.

Again, the general assembly of Maryland passed an enabling act permitting the city officials to submit to the citizens of Baltimore for approval a \$5,000,000 paving loan, the passage of which will mean the vast improvement of the city streets and the doom of rough cobblestones which have been an eyesore to the residents and visitors alike for years. Furthermore, a \$2,000,000 annex paving loan, which has been favorably voted upon by Baltimoreans, has been the means of improving the outlying districts of the city and transforming them into favorite sections for motorists. Taking all in all the dealers and owners alike are jubilant over Baltimore's future prospects as a big motor car center. Colonel Sherlock Swann, a member of the Maryland motor car commission and president of the board of police commissioners, has gone so far as to predict Baltimore will be in the midst of a horseless age within the next decade.

Police Try Motor Cars

Motor cars have made their poorest showing in the municipal and government trials. The police department tried an electric patrol and the postoffice authorities gave horseless mail collection machines a test but they did not prove as serviceable as the horse-drawn vehicles. Colonel Swann, however, is now bargaining for a more up-to-date car for police work. The Independent Hose Co., of Frederick, Md., has in service a combination fire engine and hose wagon which has done splendid work at fires. The fire commissioners of Baltimore are contemplating the purchase of motor carriages for the chief and district chiefs. The idea of having horseless fire engines has been abandoned for the present.

Speaking of commercial cars in Baltimore, several of the big breweries and drug companies have put the gasoline trucks in service during the year and they have given good service. The rough streets here, however, make it a hard proposition for these cars at present. In addition to the breweries and drug firms there are a number of other large wholesale houses that have been using these trucks for several years with satisfactory results. Several of the department stores also have electric and gasoline cars in service for delivery purposes and these, too, seem to be holding their own in the city of Baltimore.

Various contests have been promoted for the first time in and near Baltimore by the dealers and members of the Automobile Club of Maryland in 1908.

STATISTICS FROM BALTIMORE

Total sales in 1908.....	\$2,000,000
Cars sold.....	1,000
Makes represented.....	44
Salesrooms.....	25
Garages.....	20
Factories.....	2
Agencies.....	20
Branch houses.....	7

Minneapolis Gateway of the Great Northwest

By Richard E. Tucker

MINNEAPOLIS, MINN., Dec. 27—Minneapolis, the metropolis of the northwest—the gateway for the northwestern trade—was never in so prosperous a condition as at present, and never before has there been such a general feeling of confidence and optimism in the industry as there is today. Prospects for the 1909 season are of a rosy hue. As an evidence of what's doing in the trade, one dealer alone, who acts as the northwestern distributing agent for two lines, has placed an order for 2,350 cars of one make for 1909. Another, who ordered 1,000 cars of a popular make, recently ordered this increased by 50 percent and at the present writing announces that he sold out until April 1. One of the branch houses with an allotment of 500 cars, is sold out already and the managers feel that they could do the trick right over again if they could get the cars from the factory.

Northwest a Rich Field

These figures naturally bring to consideration the condition not only in Minneapolis but throughout the northwest and here, it may be said, is the richest field for harvest ever presented for cultivation to any class of manufacturers. That this is becoming recognized is shown by the fact that new deals are started almost every day showing the desire of the manufacturers to get into the northwestern field.

To go back a ways, the northwest won fame for itself during the recent money disturbance by the wonderful showing it made. It naturally was the first section of the country to recover anywhere normal conditions and then it went right forward. Good prices for the grain meant ready money well distributed, and it is this money, together with a general interest in and a demand for motor cars, that operates to produce such startling conditions as prevail today in the northwest.

Dealers Are Surprised

The dealers themselves are surprised—all sales records have been broken time and again and during the part of the year usually considered quiet the selling has continued as brisk as during the height of former seasons. The dealers as a result hardly know what to expect so far as volume of business is concerned. They are all amazed as they see the result of continued cultivation of the field, and all are happy.

One of the most notable indications of the healthy condition here in the city is the building spurt which has taken hold of the dealers. The result of this has been

the starting of a row on Hennepin avenue. Buildings are either completed or will be shortly after the first of the year for the Maxwell branch, the Stoddard-Dayton, the Pence Auto Co., handling the Buick and Stevens; the Winton branch, the Minnesota Motor Sales Co., with the E-M-F and the Studebaker, besides several new locations in the neighborhood of tire and accessory firms.

Within two blocks across town, on First avenue, another large motor car center has been started, known as the motor mart, where will be found the Pierce-Arrow, Franklin, Diamond tire, and two other firms to be announced later. These building operations alone represent an investment of \$235,000, while next spring will certainly see some other big deals started.

Other moves and combinations of agencies too numerous to mention have taken place this fall, but all with the one idea, to get more room. This seems to be the principal idea of Minneapolis dealers—to get more room, to get the latest equipment and to be able to meet the extraordinary demands which are looming up with the advent of the new year.

Under the direction of Colored Frank M. Joyce as president, the Minnesota State Automobile Association has grown wonderfully in the past year. Fourteen new clubs have been added to the list, making eighteen in all, and shortly after the first of the year this number will be increased.

Minneapolis Club Prosperous

Good roads work and special legislation receive more than usual attention and the interest along these lines is bearing fruit in many ways of advantage to motorists and the industry in general.

In the state of Minnesota it is estimated there are 4,620 cars, while in South Dakota the secretary of state's figures for the first 11 months of 1908 show 1,731 licensed motor vehicles.

The Minneapolis Automobile Club is a thriving and energetic organization composed of representative business and professional men. The membership now numbers close onto 800 with an active

campaign on which will bring the total up to nearly 1,000 by January 1. During the past year a country clubhouse at Bloomington, 18 miles from the court house, one of the most beautiful spots in the whole Minnesota river valley, has been built and is now wholly unencumbered. Over \$20,000 was spent in the grounds and buildings and in improving the roads and boulevards leading to this country home. Besides this, down-town quarters are maintained in the Hotel Plaza, where regular meetings are held. A winter's program of entertainments and lectures is under way and the "social sessions" and "open house" plan on holidays make this one of the most popular and pleasant places in the city.

Under the direction of the club officials several interesting motor contests have been held during the past year. A 2 days' reliability run for the Minneapolis Tribune trophy opened the season and this event, in the judgment of experts from other cities who were here to act as officials or merely as spectators, was one of the best tests ever held in the west. Next summer the second contest for this trophy will be run probably to Duluth and return.

Contests of the Year

A hill-climbing contest for trophies hung up by the Minneapolis Journal, also went with a snap and vigor which showed the interest and enthusiasm in Minneapolis. This contest was so successful that it has been decided by the club officials to build a private hill to order on property adjoining the club's country home, where frequent matinee events can be pulled off and possibly one or two contests of national importance, each season. Motor car day at the Minnesota state fair, also proved a great success as handled by the club officials. De Palma and Christie were the star performers when the former in a Fiat set up a new world's record for a mile on a circular track, making it in 51 seconds flat.

In addition to these events, many other stunts have been pulled off. The Minneapolis Tribune has put through several "trail-blazing" trips to nearby points, to show the feasibility of motor transportation and to demonstrate how near the cities and towns are, in hours, via gasoline or steam.

The leading business firms of Minneapolis have taken to motor delivery and truck service and the local truck dealers report a largely increasing demand for motor-driven trucks and package delivery wagons. Taxicabs while not evident here to any great extent, will come in the spring it is understood, one firm having placed a large order for spring delivery.

Interest in the electric means of locomotion is also increasing and the number of women drivers is growing amazingly. The shopping and residential districts daily see many of these fashionable equipments which seem to have come into vogue within the past few months.

STATISTICS FROM MINNEAPOLIS

Money invested in motor car business estimated	\$375,000
Cars sold during past year	2,300
Number of makes of cars handled	52
Number of dealers	36
Number of garages	23
Makes of trucks handled	5
Branch houses	3
Tire agencies	9
Supply houses	13

Pittsburg Agents Escape Panic

By H. A. Lane

PITTSBURG, PA., Dec. 27—Hard times in Pittsburg! Well, hardly, if you can judge by the reports received from two score firms which sold motor cars here this year. They expected hard times. One year ago they firmly believed they would lose money. Some of them went so far as to deliver part of their allotment of cars to agencies in other big cities. Not one of all the Pittsburg dealers looked forward to 1908 with any hope of profit beyond the living point. But the year rolled up a surprise. Pittsburg business in general was badly in the dumps. From the millionaire banker down to the corner groceryman there was a constant cry of "tight money" and "hard times." But the strangest thing of the situation was that these forty motor car firms came through the year with a constantly broader smile on their faces and that they are almost a unit in saying that 1908 was the best year Pittsburg ever experienced.

Pittsburg Sells 700 Cars

It is conservatively estimated that the total of Pittsburg sales for 1908 will run close to 700 cars. A half dozen of the largest agencies in the city sold about 400 of these cars—the Bunker Brothers Co. and the Standard Automobile Co. heading the list. The other sales were widely distributed among the different agencies in Pittsburg and its suburbs, for the suburban trade has become so profitable the past 2 years that agencies are now being established in all the nearby boroughs.

Several things stand out prominently in the year's dealing. One is that the medium-priced car was a winner in sales. This may be attributed directly to the financial stringency which made it necessary for many buyers to limit their purchases to cars costing not over \$2,500 each. There was a large number of touring cars costing from \$4,000 up sold, but the increase in this sort of business was not so large proportionately as in previous years. There was a large amount of trading all through the year. Persons who had purchased cars in 1906 or 1907 and who, having made a careful study of the motor car situation since then, were not wholly satisfied with

their machine came to the dealers in large numbers to exchange them for other makes or have more costly cars of the same kind. Then, too, the increase in business with the country towns was very encouraging. A large proportion of the best orders placed during the year were with wealthy residents of towns within a radius of 40 miles of Pittsburg. So brisk and profitable has this business become that since the rush season is over several Pittsburg concerns have started out to establish sub-agencies throughout western Pennsylvania, eastern Ohio and West Virginia.

Limousines Are Popular

The sales of limousine bodies were large all the year. Glesenkamp, Sons & Co., E. J. Thompson and the Standard Automobile Co. handled most of this business. Several new costly garages were built during the year, the feature of this being that new agencies were scattered over the city instead of being bunched in the old-time center in the east end.

The year was especially noticeable for the shifting of agencies. After the 1908 business was fairly started there was a great scramble for new agencies for 1909. As a result several of the most important cars will be handled by different firms the coming year and many new cars will be exhibited by the new agencies here. All agencies are placing orders for more cars than ever before. Those which got caught by letting some of their cars go last year have profited by their experience and are taking all they can get from the factories.

Pittsburg now has three concerns manufacturing cars. The Fort Pitt Mfg. Co. at its new plant at New Kensington, Pa., 20 miles up the Allegheny river from Pittsburg, is manufacturing the Pittsburg Six car. The Belden Automobile Co. is putting on the market a new car which is largely the work of E. H. Belden. The Pittsburg Motor Vehicle Co. at its plant in Ellsworth avenue, east end, is turning out commercial vehicles, ranging in capacity from $\frac{1}{2}$ to 3 tons each. The future of the commercial vehicle seems to be assured in Pittsburg for the fifty or more trucks which are now in this section are giving splendid satisfaction.

Indication of the better feeling that exists in motoring circles is seen in the progress which the Automobile Dealers' Association is making in the third annual show which it will hold at Duquesne garden, March 22 to April 3, 1909. Last year the first space at the show was not sold until February. This year all but four of the fifty spaces have already been taken by the dealers at a price of 85 cents per square foot.

Business in Accessories

Business in accessories has increased in proportion to the growth of the motor spirit here. New agencies are being established almost every month and very few of these are forced out of business. Aside from the ten regular accessory stores there

are two very large general stores downtown which have big motor accessory departments. The manufacturers of tires also are finding that Pittsburg is a mighty profitable place in which to have an agency. Practically every make of tires is to be found in Pittsburg today and manufacturers who a few years ago dreaded to invade the Smoky City on account of its bad hills are now reaping good profits from having furnished Pittsburgers tires especially adapted to hard wear.

Best Year of All, Says Hartford

By William J. Johnson

HARTFORD, CONN., Dec. 27—Hartford experienced the best year in the history of the production and sale of motor cars, as well as of tires and other accessories. At the commencement of the season of 1908 things looked rather dubious and even the optimistic element were loth to put in as representative a stock as the year previous. But optimism is a great factor and Hartford has its share of it, with the result that the season now over has proven to be "the best ever."

Hartford has a population of approximately 100,000, and is the home of the Pope and Electric Vehicle companies. During the past year two new makes of cars have made their debut, the McCue-Hartford and the Maxim Goodridge electric. The former is now and has been produced for some time past, though the latter is not as yet being manufactured, pending final arrangements.

Two Concerns Fail

During the past season two local companies experienced difficulties that often confront a manufacturer, the Pope Mfg. Co. and the Electric Vehicle Co. The former is now a reorganized company and the latter bids fair to be within a comparatively short time.

With the accessory manufacturers who produce cylinder castings, tires, aluminum castings, models, universal joints, odometers, coolers, etc., business has been good and promises to be more so next season. The Hartford Rubber Works Co. has been running nights in some departments for quite a while and there is every indication that this will be necessary for some time to come.

Every one of the fifteen local dealers representing twenty-eight different cars

STATISTICS FROM PITTSBURG

Capital invested	\$1,000,000
Number of branch houses in Pittsburg	2
Number of dealers	40
Number of makes of cars represented	55
Number of car manufacturers	3
Number of commercial trucks	50
Number of commercial agencies	5
Approximate number of cars sold	700
Number of tire agencies	10
Number of exclusive supply houses	8

STATISTICS FROM HARTFORD

Number of motor car dealers	15
Number of makes of cars represented	29
Approximate number of cars sold in 1908	400
Number of tire agencies	17
Number of supply houses	6

regards the situation as most favorable. The sales of the season, including new and second-hand cars, approximate about 400 vehicles. There are seventeen tire agencies in the city, most of which do a good business in the course of a season. The local product, the Hartford tire, has done a big percentage of the local business. There are half a dozen supply houses, the largest of which is Post & Lester. A downtown branch was opened last March and the wise ones shook their heads.

There are many electrics in use in this city, though the sales of them have not been heavy during the past season. Many of this type of car are of the vintage of a few years back, but seem to do about as good work as ever.

Like Commercial Cars

Commercial cars are coming more and more into prominence. Hartford is a New England town and typically conservative. In other words, those who would install vehicles of this type would much prefer to let the other fellow experiment, as it were. Yet the representation is larger than it was a season ago. Quite a few improvised cars are in use, that is, pleasure car chassis fitted with wagon bodies. But the work is tangible proof of their worth. In this connection there is a good field in this town for a taxicab service. A local wideawake garage man has a well-laid scheme for the installation of these vehicles and it is quite probable that such a service will be installed during the season of 1909. One coach, electric, is at present in service. The local police department lately added a Pope-Hartford gasoline ambulance to its equipment and the fire department recently had the Knox combination chemical and hose wagon overhauled and a new power plant and chassis installed.

Lively Year in Sports

The season of 1908 marked a lively epoch for the Automobile Club of Hartford which in a few months attained a most healthy growth. At the annual election in April the old officers were unanimously re-elected. Club quarters were secured at the Allyn house, where the organization is both well-housed and cared for. An endurance run was conducted by the club last May and proved to be a big success. A successful gymkhana was held at Charter Oak park in the late summer, the proceeds of which were devoted to charity.

A successful motor car show was conducted by the Hartford Automobile Dealers' Association at Foot Guard hall last March. Attendance throughout the week was very good and as a result of the event many car sales were made. The dealers'

association later in the season fixed rates for repairs, storage and the like. The dealers' association also conducted a successful show at Charter Oak park last September. The event was in connection with the state fair. All of the dealers were not able to secure their 1909 models in time.

Opening in South Is Discovered

By Percy H. Whiting

ATLANTA, GA., Dec. 27—Nineteen hundred and eight ought to go down in trade history as "the year they discovered the south." Until this year this section of the United States south of the line made justly famous by Messrs. Mason and Dixon has been quite overlooked by the makers of motor cars. Just why we do not pretend to say. Perhaps other sections offered better fields until recently. Anyhow, it happened that this year makers of cars awoke to realize that they were overlooking a good bet. Whereupon they began to get busy, and Atlanta proved one of the centers of their greatest activity. Two manufacturers have opened southern branches in Atlanta during this year. They are the White company and the Maxwell-Briscoe company. The southern branch of the White company came into being along about the middle of the season when E. W. Gans came down from Cleveland and opened headquarters at the Piedmont hotel. He closed at once for permanent quarters by leasing for a long term five-eighths of the \$40,000 Glenn building, then in the architects' hands but now a finished product. During October the southern branch moved into its new quarters. In 6 months this branch has sold over \$100,000 worth of cars in the south.

Even an earlier branch was that of the Maxwell-Briscoe company, which was incorporated as a separate company, the Maxwell-Briscoe Southern Co. It had a garage built for its own use and has sold between 300 and 400 Maxwells in the south this year. The Maxwell business outgrew its old quarters and at present a new garage is being constructed for the southern branch. It will represent an investment of \$15,000 or thereabouts and will be used by the new taxicab company as well. This concern has just been organized and will soon start off on a decidedly pretentious scale.

Changes of the Season

The business changes among the garage men and dealers have been so numerous that nobody has kept up with all of them. Frank Steinhauer bought out in mid-season the American Motor Car Co. and now occupies the Peachtree auditorium garage, selling Packard and Pope-Hartford cars. W. C. Nesbit, local agent for the Peerless car, left his Pryor street store and took the

garage left vacant by Mr. Steinhauer. This vacancy is being temporarily filled by the Buick agency, just opened under a new management.

At the Columbia garage M. C. Huie sells Fords and agencies are conducted for the Lane steamer and the Brush. The Cadillac, which has never before been actively represented in Atlanta, is being sold by an agency at 64-66 South Forsyth street, and the Chalmers-Detroit has opened an agency at 103-105 North Pryor street. The Pierce-Arrow is now being sold by John M. Smith at 120-122-124 Auburn avenue, and the Lambert is on sale for the first time by the Southern Auto and Equipment Co., at 64-66 South Forsyth street. The Studebaker company has entered the territory in earnest and will soon open a big place in the heart of Atlanta. The Atlantic Motor Co. has just been organized to sell Reos and Overlands. H. L. Hopkins is president and the garage is at 41 Ivy street.

The accessory business has had at least one change during the year and two firms are now in the business.

Many Tire Branches

Atlanta continues to be the chief tire headquarters of the south. The southern branches located here are Hartford, Fisk, Morgan & Wright, Goodyear and Goodrich. The Empire is represented by an agency.

A general averaging up of the estimates of dealers places the number of cars sold in Atlanta as 350.

Motor Trucks Take Well in Syracuse

By W. E. Marshall

SYRACUSE, N. Y., Dec. 26—With the passing of the year 1908 goes the record-breaking year of the motor car business in Syracuse, and with the advent of 1909 comes a year that brings with it the brightest prospects for local dealers in the history of the business. The year 1909 is ushering in a new era in the business so far as the manufacturing end is concerned in Syracuse, in the form of the commercial car. The motor truck has caught on with a vengeance in this vicinity, and the two local manufactoryes, the H. H. Franklin Mfg. Co. and the Chase Motor Truck Co., see bright times ahead for this particular

STATISTICS FROM SYRACUSE

Approximate capital invested in the motor car industry in Syracuse	\$2,100,000
Number of branch houses in Syracuse	2
Number of motor car dealers.....	8
Number of makes of cars represented	13
Number of cars sold in 1908.....	250
Number of tire agencies.....	6
Number of supply houses.....	6

STATISTICS FROM ATLANTA

Cars sold in Atlanta.....	350
New branches established.....	2
Tire branches	5
Tire agencies	1

line of their business in the new season. At the beginning of the present year the Chase Motor Truck Co. planned to manufacture 150 high-wheeled delivery wagons, providing there was a demand for this number. This particular style of wagon caught on with the merchants, farmers and market gardeners right from the outset, with the result that the company now has contracts signed for 500 such wagons.

Truck Company Started

The Chase Motor Truck Co. was established 2 years ago, in temporary quarters from which the trucks were turned out until about a year ago when the equipment was moved into a new building, with better facilities and especially adapted to the business. The company now has an invested capital of \$80,000 and a business that is making a phenomenal growth. During the week of the New York state fair last September orders were taken for \$140,000 worth of these trucks.

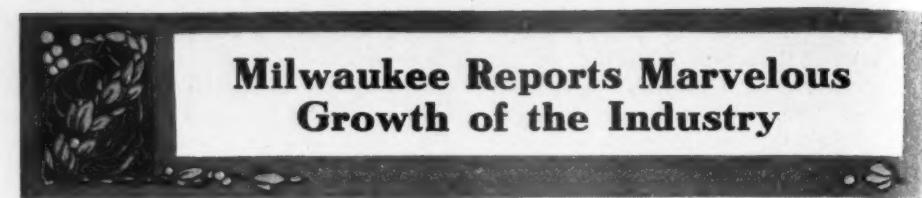
The H. H. Franklin Mfg. Co., which now has an invested capital of nearly \$2,000,000, is also going to make a special line of motor trucks during the coming year as well as motor cabs for commercial use. There has been a great demand for the air-cooled motor cab from the northern part of the state. During the year the Franklin company has erected an addition to the present factory 105 feet by 65 feet and five stories high which will be used jointly by the manufacturing end of the business, the engineering department and the offices of the advertising staff.

A local salesroom of considerable dimensions is also being contemplated and probably will be erected during the early part of 1909. The company has built an addition of considerable size for the sole purpose of storing tires, with a capacity of over 100 pairs. Over 1,300 cars have been sent out from the Franklin factory during the year.

Franklin Tests Alcohol

Considerable demonstrating and experimenting has been done by the Franklin engineers during the year on the alcohol motor, and the company now states positively that it is going to be a success and will be placed on the market during 1909.

The year just closed has been a prosperous one for the dealers and agencies in this city, not a single agency having gone out of business, and the field looked so inviting that three new ones have opened up. The prospects are that there will be another within a few weeks. The Oldsmobile company, of Detroit, has been endeavoring to secure a suitable site for a branch house, and is determined to locate here. Within the last 2 months the Packard and the E-M-F have been placed on the market by C. Arthur Benjamin, and have met with an encouraging reception. Knox cars will henceforth be handled by the Cronin Automobile Co. and William Cahill is taking the agency for the Gaeth. Both of these agencies have been placed since December 1.



By Leonard E. Meyer

MILWAUKEE, WIS., Dec., 28—It will be a whole-hearted, a conscientious "Happy New Year" that will be passed as the season's best greeting by every man in Wisconsin who has any connection with the motor car industry, this New Year's day. Despite financial storm or time of stress, those that were here a year ago are here today, and they have with them nearly double their own number in new men. True, there have been numerous changes and transfers, but the final reckoning shows a marvelous growth in every department of the motor car industry, be it manufacturer, branch agent, dealer or agent.

One year ago there were fewer than twenty dealers in Milwaukee. Today there are twenty-eight, and before the first week of 1909 has passed this number will be increased to thirty. The number of makes represented has risen from twenty-five to forty-three. The number of tire and accessory depots has increased from ten to twenty-one. Annual sales have increased from approximately 500 in 1907 to about 780 this year. No fewer than four public garages and saleshouses have been erected. This has entailed an investment of \$50,000 each on the average, or \$200,000 for the whole. Besides this there have been built twenty to thirty private garages, expensive structures, nearly every one of them.

Agents Well Organized

Nearly every Milwaukee agent is the general representative of his house for the entire state of Wisconsin, and the passing year has seen the organization of one of the most compact and easy-running "machines" in agency forces of any in the west. Once a prospect obtained, the machinery is set in motion, and the sale is accomplished.

The entrance of the White steam car, the Marmon, Midland, Overland, Stearns, Chalmers-Detroit, Moon, Moline, E-M-F, Studebaker, Cameron, and the well known

lines of electrics into the Wisconsin field during the year made a decided difference in the work of the dealers and branches. The competition was nicely met, nobody suffered and the result was for the benefit of all. Milwaukee is, perhaps, one of the few towns where every dealer meets his competitor like a man.

Milwaukee is not filled yet. There is room for plenty more. Such excellent cars as the Apperson, Knox, Austin, Haynes, Stevens-Duryea, Chadwick, National, Matheson, Great Western and a number of others have no representation. Milwaukee, and the state of Wisconsin, too, are good fields for the motor car. The state has nearly 3,000,000 people, yet the number of cars in use today is not more than 7,000 or 7,050. But it is safe to predict that a year from today there will be cars on the streets bearing license numbers as high as 10,000.

Milwaukee Club a Hustler

To the Milwaukee Automobile Club is due a large share of the present prosperity the motor car industry is experiencing. This body has done more to bring the motor car into public favor than any other agency. It has conducted several pleasure runs into the heart of the enemy's territory and returned victorious. It has favored and worked hard for good roads; against undignified and unlawful acts and habits of owners and drivers. The Milwaukee tradesmen and the club have been fast friends, and the trade association has about disappeared. Its members are M. A. C. members, and the industry is in the better condition for it.

Where, a year ago, an electric coupe, victoria or brougham was a curiosity on Milwaukee streets, today they flit about in scores. The electric's grasp on this city is remarkable. It is essentially a woman's car and the woman driver has taken rank with the men in numbers. The year has seen the coming of the Waverley, the Woods, the Studebaker, the Babcock, and only a few days ago the Detroit electric made its appearance.

The manufacturing contingent has had an addition this year in the Johnson Service Co., manufacturing the Johnson gasoline car. This company's first venture was the steam car for use of the Milwaukee postal service.

Outside of the postal motor cars, the commercial car has found favor. Its uses are many. The piano mover, the wholesaler, the grocer, the jeweler, even the structural steel manufacturer has found motor truck a necessity.

STATISTICS FROM MILWAUKEE

Amount of capital invested in industry in Milwaukee, approximately	\$2,750,000
Number of branch houses	3
Number of motor car dealers	28
Number of makes of cars represented	43
Approximate number of cars sold in 1908	780
Approximate number sold in Wisconsin, including Milwaukee	1,250
Number of tire agencies	9
Number of supply houses	12
Number of manufacturers in Milwaukee	2
Number of manufacturers in Wisconsin	5
Number of manufacturers of motors, parts, etc.	10

Great Motoring Possibilities Exist in St. Louis

By E. Percy Noel

ST. LOUIS, MO., Dec. 28—With a population of approximately three-quarter million, St. Louis is backward about motoring. For all the motoring possibilities among these many people, the city license clerk has provided only 3,000 tags for 1909. Yet this is better than last year, when 2,500 was the order.

Think of it—only 3,000 motor cars in this great city! It is practically a virgin field. The opportunity to sell cars can scarcely be greater anywhere in the United States, if not in the whole world. Manufacturers, looking for foreign markets, should come here and take a good look at this great city, 20 miles—or more—long, and 8 miles wide. They should meet the wealth of the city, should see the thousands of back yards of \$25,000 houses without garages. Successful salesmen from New York and Chicago—men who know how to sell things to people who do not want them—should remember that their market places are full of men like them, but that in St. Louis the motor salesman is practically unknown. New York and Chicago have been loaded up—that doesn't mean that both these cities will not buy thousands more—with motor cars; poor St. Louis has really not had a good chance to buy!

Should Be Good Town

The reasons St. Louis should be one of the best motor towns in the country might be treated in a separate and longer article; but two of the good ones may be summed up in this way: It has no rapid transit system, although the best residential districts are 5 miles from the principal business section; several smooth streets connect these districts. Five minutes from the west end, and 15 or 20 minutes from downtown—by motor car, of course—commences the real country, with fine macadam ways, many of which are oiled; hills and dales; attractive scenery, and much less police surveillance as to speed than one finds in Chicago suburbs, or the closely-populated east. What an opportunity for the motor car!

But those who would avail themselves of the opportunities of St. Louis' motoring youth will, to adopt the ballayhoo spieler's vernacular, "have to hurry." As has already been indicated, affairs in St. Louis are on the march. Some wise ones already have seen and appreciated the situation. Even the past year shows a noticeable advancement in all affairs pertaining to the motor car. One dealer at least has attended the New York shows, made a tour of Europe by car, and come back to his

agency with broader ideas and accompanying vigor to prosecute his campaign. As a result he has sold more Packard cars in St. Louis than there are here of any other make, and really could have sold twice as many if he had had the foresight—or daring—to order them early in the season.

The Automobile Club of St. Louis, influenced by hardy workers in the persons of Roy F. Britton, Samuel Capen, Alden H. Little and James Hagerman, Jr., has been repeatedly heard from. Many miles of the country roads have been oiled through the efforts of the club, decent treatment has been received from the city police and the country constabulary, and one notable road event has been successfully run off.

Club's Successful Test

The club held its road test in the form of the second owners' reliability run for the James Hagerman, Jr., trophy, June 27. Twenty cars started in the 109.2 miles event, among whom there were no dealers, nor their representatives.

More recently, with the usual agency activity of the season, the Maxwell-Briscoe Motor Car Co. announced a branch would be opened here this month. Soon after the Buick Motor Co. stated it would open a branch here and secured large salesrooms on Twelfth street, between Olive and Washington avenues.

A few weeks ago the Studebaker cohorts arrived in St. Louis, under the leadership of LeRoy Pelletier, placing the agency for the line with the Colonial Automobile Co., well-known as the agent of the White steam car. Several of the cars arrived in the city with much blowing of trumpets and followed their arrival with a parade through the principal streets. The car has not been handled here before.

There are thirty-seven concerns handling motor cars in St. Louis, but not more than ten of them are active sellers of cars. One of the newest of these is the Doyle Motor Car Co., with the agency for the Frayer-Miller. The Fisk, Goodrich, Republic and Firestone tires are represented in St. Louis by branches. The Neustadt Automobile and Supply Co., which recently passed into new hands, has the Continental. A dozen dealers sell supplies exclusively or in connection with some other business.

Seven makers—if motor buggies may be

so called—are located in St. Louis, but it is a significant fact that only one of them will exhibit in New York, during the coming show season there. This is the Moon Motor Car Co., of which Joseph W. Moon is president. The Dorris Motor Car Co. will exhibit at the show in Chicago. This concern does not have an agency in New York, but sells the bulk of its product in the west; a great many Dorris cars are owned locally. The St. Louis Car Co.'s motor car department has not been very active in the past few months. It was stated recently that the American Mors, the car made, would not be seen at the shows this year. It is persistently rumored that some important change is pending in St. Louis Car Co. organization, but the concern is careful to keep the facts from the public.

Accessory Makers

Among the accessory makers the Supplementary Spiral Spring Co. is particularly active. A. L. Dyke recently sold out his interest in the Phoenix Automobile Supply Co., of which he is manager, and it is rumored that he will go into the manufacturing side of the business. The Vehicle Top and Supply Co., also the St. Louis Buggy Top Co., are active. The Anti-Selenite Co. manufactures a carbon cleansing compound.

Progress of Electric

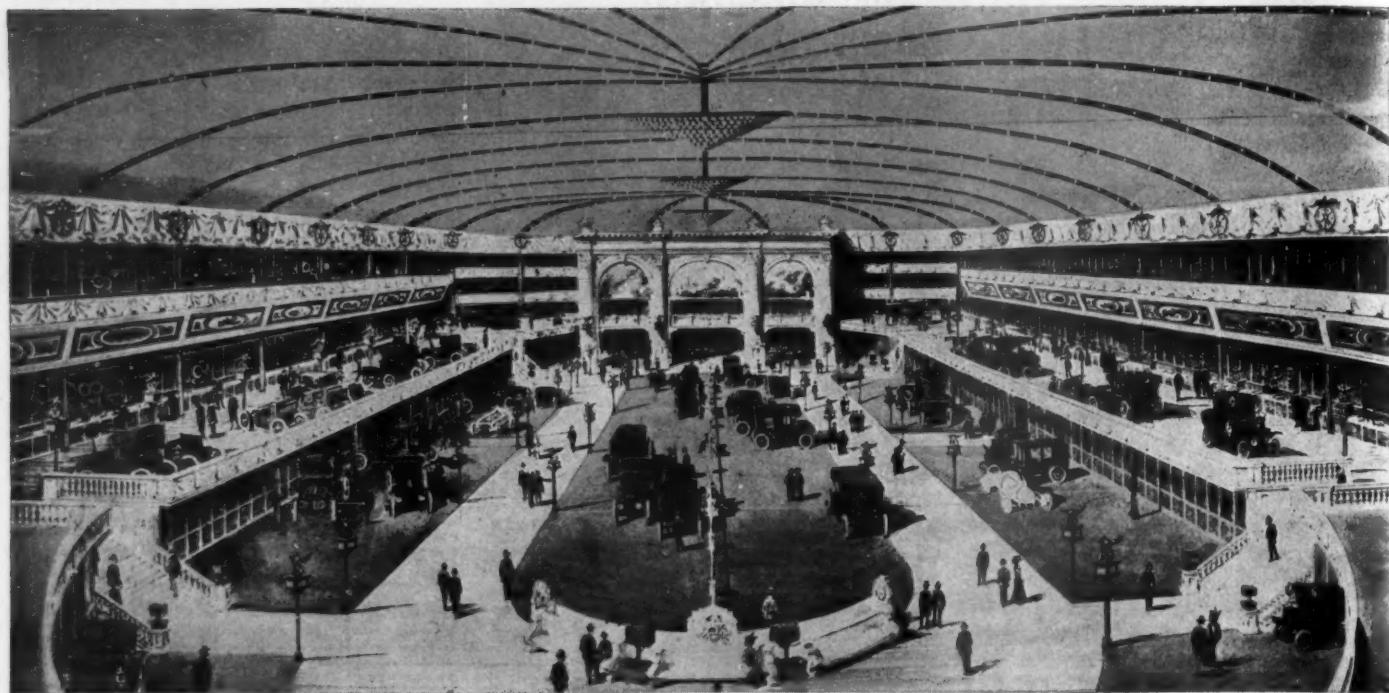
Electric cars lately have been sold to a certain extent, more being placed during the past 2 years than in all other years combined. The Union Electric Co., which controls the principal lighting contracts of the city, has the agency for the Rausch & Lang, also for the Columbia, and operates the only public garage in St. Louis that is devoted only to electric machines. There is no doubt that this garage has done much to promote the use of electrics in St. Louis. Many of the machines are owned by women who operate them downtown and uptown, as they do in Chicago, Cleveland and other cities. This is an innovation of the past year for St. Louis. There are few hills in St. Louis that must be encountered in the ordinary traffic and none of them are very steep. The asphalt and smooth paving extends through the districts where pleasure electrics need be used, and the extent of beautiful Forest park provides a particularly well-adapted driving place for the electric.

There are no agents for commercial vehicles in St. Louis who push the machines sufficiently for them to be known. In spite of the fact there are many opportunities to place commercial cars here. There are several large users, and others are gradually taking up this modern means of hauling and delivery. The Anheuser-Busch Brewing Co., with an equipment of more than fifty heavy-haulers, is the largest user; other prominent ones include the Simmons Hardware Co., the Lewis Publishing Co. and the Scruggs, Vandervort and Barney department store.

STATISTICS FROM ST. LOUIS

Cars owned in St. Louis.....	3,000
Motor car factories.....	7
Motor car concerns.....	37
Tire branches	4
Dealers in supplies.....	12

GARDEN IS NEXT ON THE SHOW CIRCUIT



GENERAL VIEW OF MAIN FLOOR AS ARRANGED FOR THE MADISON SQUARE GARDEN SHOW

NEW YORK, Dec. 28—For many years Madison Square garden may be said to have been to New York what the circus Maximus was to ancient Rome. In the garden the big shows, such as the wild west and the circus, with its chariot races, have held forth, similarly as the big races were held on the concourse of the circus Maximus. Yet in all its history of varied service the garden never has been treated by any showman or decorators as if it were related to the famous Roman arena. The novel idea of doing this remained to be taken up by the promoters of the annual motor car show. The idea is now being carried out for the ninth national exhibition, to be held under the auspices of the Association of Licensed Automobile Manufacturers, January 16-23. The result will be an entirely new handling of the big amphitheatre from a decorative viewpoint, simple and yet magnificent beyond all previous occasions.

Semblance of Circus Maximus

In seeking to produce within the garden a semblance of the circus Maximus, the primary thought was to "open it up" and give the impression of spaciousness. All the signs and decorations of the main floor will be subordinated to this idea and kept lower than usual, so as not to interrupt the view from end to end. This scheme of "opening it up" is in distinct contrast with the work of bygone years, when decorations and signs, although handsome, cluttered the view. The sense of spaciousness that one will get will be aided by an artful method of doubling the whole main amphitheatre by means of mirrors. A massive arch at the Fourth avenue end of the garden will be fitted with great mir-

rors so set that the floor will be reflected and the visitor will seem to be peering over twice the space he is, and looking through a big triumphal arch that apparently is set in the center of this modern circus Maximus.

In working out this idea, W. W. Knowles, the architect, who conceived it and who has done the designing for the whole show, has missed no point of which advantage might be taken. The layout of exhibitors' spaces, of the elevated platform, the galleries, railings and other features, will be made to lend themselves to the idea, by being all in curved lines instead of angles. Most important in obtaining this effect is the building of the platform over the entrance, which for the first time will be in the shape of a half circle, so that from the entrance the mirrors will make it seem that one is standing within a complete ellipse and looking far away toward the other end of it.

The actual work on the decorating and the execution of Mr. Knowles' designs is in charge of S. R. Ball, who has done this work in former years. For the main floor the color scheme is brown and white and green, beneath a sky of azure blue. Immediately beneath the canopy of blue the girders of the garden dome will glitter with myriad incandescent lamps, and a new feature of lighting will be found in twenty-five flaming arc lights, with colored shades, that will depend from the iron beams of the roof.

Green Carpet on Floor

The floor beneath will be carpeted with green, where the exhibition spaces are, and bare boards will serve for aisles. In a row down the center and at all the spaces

of the sides will be white lamp-posts that will inform visitors of the names of the exhibitors, and will be also guide-posts, directing them to the various departments of the show. Between the central row of posts will be tufted seats. Opposite the Madison avenue entrance will be a low electric fountain of gray stone, that will sweep in a curve about the foremost exhibits of the central space, the convex side being toward the entrance. In the basin of the fountain, beneath plashing sprays of water, illuminated by parti-colored lights, goldfish will disport themselves, while real pond lilies ride upon the wavelets.

Main Walls in Panels

The walls at the sides of the main floor will be laid out in panels finished with burlap, having its natural hue of buff. The face of the elevated platform above these artistic brown panels will be festooned with white bunting, and the railings of this platform, which slightly overhangs the main floor, will be white.

At the Fourth avenue end of the main floor will be the masterpiece of the whole great plan, the big triumphal arch, having three bays and extending from floor to roof. This arch will measure 87 feet across and 48 feet in height. It will be of staff and dead white. It will have corinthian columns, three-quarters free, and these will be on pedestals 8 feet in height. Below the cornice of the arch, the soffit will be studded with electric lights, while huge bronze lamps will swing on massive chains adown the column fronts.

The elevated platform will be supported from the main floor by white Doric pillars and also the steps leading to the platform

will be white. The walls back of the platform will be finished in panels of brown burlap, and in the beveled soffit, between the walls and the facing of the gallery, will be oval panels containing frescoes that depict the history of vehicular progress. These illustrative panels will be on both sides of the amphitheatre, and the pictures will tell the story of man's advance in personal transportation from his seat astride the little ass to his seat at the wheel of an aeroplane. Above these colorful panels will be the face of the gallery, draped in white bunting; back of this the side wall will show in brown burlap, and above, between the sky line and the vertical decorations, will be an apron of white bunting, tufted and festooned.

Novel Latticed Arbor

Even as the main floor, the different departments of the show in various parts of the garden, will have a wholly new treatment. Nothing more novel ever has been introduced in decorations than the latticed arbor that will hood the concert hall with an arch 42 feet in span and 28 feet in height. This arbor will have vines and lanterns hanging from it and the room will be lighted softly through its lattice work. The woodwork of the arbor will be all white and at the sides the walls will be finished in the natural burlap, thus preserving the color scheme of the main floor. The barreled vault of the arbor will be supported by latticed columns, and the tympanum at the end of it will be in three sections, each draped with vines and bearing the show emblem.

KILLING JOY RIDING

Baltimore, Md., Dec. 26—At its regular meeting the Automobile Club of Maryland made it plain that it will compel owners of garages to put in proper timing systems with a view of ending joy riding. The club will propose a city ordinance to remedy what is recognized as a defect in the present conditions unless the garage owners voluntarily put in the desired system. The club contends that if all garages would observe such a system for timing the departure and return of cars owners would have an excellent chance to discover whether chauffeurs use their cars without consent.

BALTIMORE AFTER FIAT PLANT

Baltimore, Md., Dec. 26—Mayor Mahool is anxious to have the Fiat company locate its proposed American factory in Baltimore. He has instructed the industrial commission here to get in communication with the company without delay and try to bring the factory here. Mayor Mahool said: "I do not believe any other city in the country can offer advantages that are superior to those of Baltimore. I am anxious for the industrial commission and the trade organizations of the city to put forth every effort to have the plant brought to Baltimore."

AID TO SANTA CLAUS

Indianapolis Makers and Dealers Lend Helping Hand in Charity Work At Yuletide

Indianapolis, Ind., Dec. 28—Santa Claus and his reindeer sleigh have been relegated to the background in Indianapolis. Both have been found to be too impracticable and unsatisfactory and as a result the motor truck and the touring car have taken their place. For many years it has been found that Santa Claus has been visiting only the homes of the fortunate.

This year, through the efforts of the local newspapers and motor car manufacturers, every poor person in the city was reached and remembered in a liberal manner. The Indianapolis Star conducted a Santa Claus fund for the children and carried blind children to the public institutions to sing Christmas carols; the Indianapolis News promoted an old folks' fund and sent baskets filled with Christmas dinners to the aged unfortunate. But for the kindness of motor car manufacturers it would have been almost impossible to carry out the delivery of the packages. In the midst of their busy season, the manufacturers and owners placed every available car in service and several hundred deliveries were made within a few hours' time.

The Star, through its Santa Claus fund, raised money which was expended for candy, peanuts, toys, dolls, games, books and stockings. These were packed in big flour sacks, each sack representing a family. There were 1,156 of the sacks distributed.

In the past it has been necessary to engage about twenty-five large moving vans for the work and even with this large number, some of the wagons have been until far in the night in making the deliveries. This year the motor truck manufacturers and other business men asked the privilege of making the deliveries, without a cent of expense to the fund.

As a result the deliveries were completed by 6 p. m., in little more than 4 hours' time, and a substantial saving in money was made. The following concerns donated the services of trucks and drivers: Premier Motor Mfg. Co., two touring cars; Indianapolis Motor Car Co., two Rapid trucks; the Nordyke & Marmon Co., Marmon truck; National Motor Vehicle Co., National truck; Capital Paper Co., Rapid truck; Morton Place garage, Sayres & Scoville delivery wagon; Central Supply Co., Rapid truck; Shank Furniture and Storage Co., Rapid moving van; Knight & Jillson, Rapid truck, and the Waverley Co., Waverley truck.

At the same time the Indianapolis News distributed its Christmas baskets, although different cars were used. Each basket contained a chicken, fruit, sack of flour, potatoes, jellies, canned fruit, etc., representing

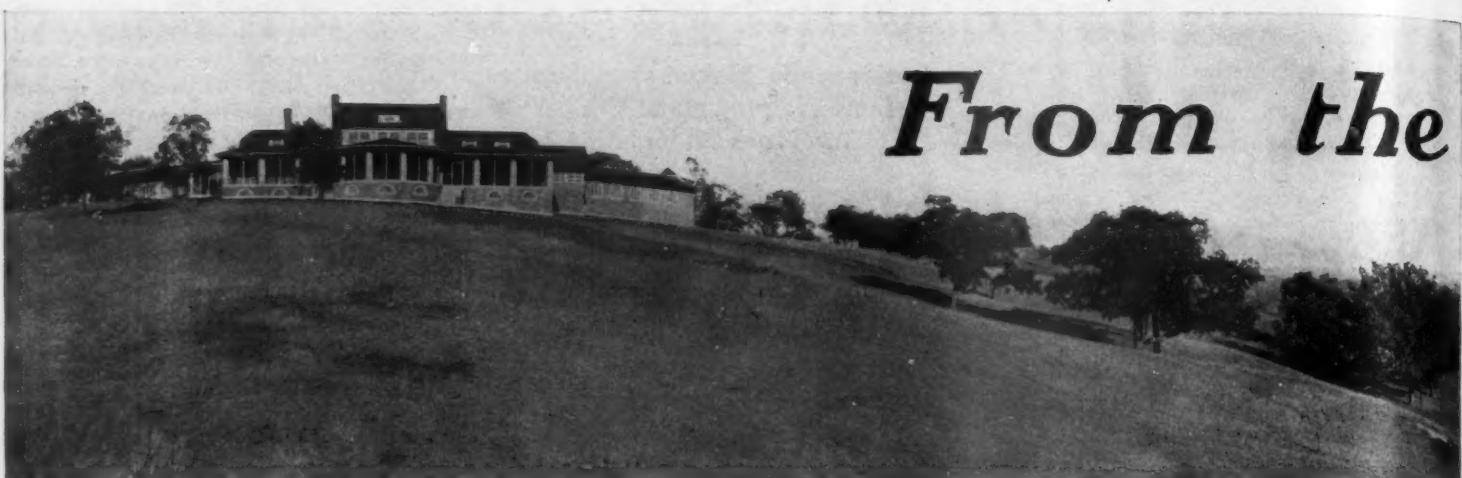
a value of about \$3. There were more than 200 of the baskets distributed. All of the deliveries for the News were made by the Premier Motor Mfg. Co. There were eight Premier touring cars and trucks in the delivery train and the work was completed before dark, much to the joy of the poor of Indianapolis.

On Christmas afternoon the annual custom of having inmates of the Indiana state institution for the blind sing in the jails and other public institutions was carried out by the Star. Thirteen big touring cars loaned for the occasion, together with the services of the drivers, spent Christmas afternoon going from one institution to another. The cars were supplied as follows: Premier Motor Mfg. Co., three Premiers; Nordyke & Marmon Co., Marmon; Stoughton A. Fletcher, banker, Maxwell; Buick-Losey Co., Buick; Henry Lawrence, hotel manager, Packard; William H. Roberts, county commissioner, Haynes; Miss Elizabeth Love, Premier; Louis Deschler, cigar dealer, Premier; Theodore Layman, wholesale hardware merchant, Apperson; Willias-Haywood-Holcomb Co., Packard; Ginson Automobile Co., Premier.

The institutions visited were: Methodist Hospital, Home for Friendless Women, Eleanor Hospital for Children, Marion County work house, city hospital and the Deaconess hospital.

URGE GOOD ROADS BONDS

Spokane, Wash., Dec. 25—Members of the legislative committee of the state good roads association, will submit a proposition to the legislature of Washington to amend the constitution, authorizing the state to issue bonds of \$20,000,000 for state road work. The purpose is to complete as rapidly as possible the various road projects now under way. If the bond issue meets with opposition the legislature will be urged to increase the levy for the highway fund to 1 mill. When the highway commission was created a public highway fund was established to be kept up by a direct tax levy, the levy being fixed at $\frac{1}{4}$ mill. The last legislature increased this to $\frac{1}{2}$ mill, and a revenue of \$132,553 for 1907 and \$286,536 for 1908 resulted from this source. The estimated revenue for 1909 is \$374,296. From this amount the last legislature appropriated \$225,000 for state roads, and it is estimated that this sum will hardly be sufficient to complete the contracts already let, although there will be but a small deficiency. The state now has thirteen road projects. Under the present plan of making appropriations from the state highway, about \$117,000 should be available for this work in 1909. At that rate of revenue it would take 24 years to complete the road work on the surveys which have already been made without considering improvements and repairs. It is also estimated that if the \$20,000,000 bond issue were made it is doubtful if it could be expended judiciously in much less time.



Photograph by Sweet, Minneapolis

REMARKABLE PICTURE SHOWING THE MINNEAPOLIS AUTOMOBILE CLUB'S COUNTRY CLUBHOUSE AT BLOOMINGTON, 18 MILES

Drafts New Bill—A motor vehicle law has been drafted for the Denver Motor Club by Attorney Frank England. This bill, which is modeled after laws that have proven most satisfactory in the eastern states, will be presented at the next meeting of the state legislature.

Will Post Signs.—An enthusiastic meeting of the Automobile Club of Hartford was held recently at the club rooms in the Allyn house at Hartford, Conn. After the regular business meeting an address on tires was delivered by A. E. Friswell, a British tire expert. When the spring season opens up, every route emanating from Hartford will be sign posted.

Horses Must Go.—The municipal service motor car squadron at Springfield, Mass., will be increased when the police commission will place in service the new police combination motor patrol and ambulance which the Knox company has just completed. In a few days the car will be officially inspected and then it will be placed in the garage at police headquarters. The old barn which is being remodeled into a garage is not quite completed, but will be by the latter part of the week ready for the housing of the new patrol. Springfield intends to have a second motor patrol and to discard horses for all time.

Echoes of Big Run.—An echo of last May's endurance run of the Harrisburg Motor Club was heard when the case of Chester H. Smith, one of the contestants, whose car had struck James L. Douglas, a prominent citizen of Reading, while coming into the control in the latter city came up. The charge was "aggravated assault and battery." The testimony showed that the low gear was engaged at the time, and that the car could not have made more than 4 or 5 miles an hour. It was further shown that Mr. Douglas, who was an old man, became bewildered and was pulled by a rattled bystander directly into the path of the car, as it slowly swung into its proper place in the line of cars waiting to be checked out. As the testimony

showed that Mr. Smith had exercised due caution in every particular, a verdict of not guilty was rendered by the jury.

Again the Motor Car.—The advantages of a motor car to get to a place when all else fails was shown last week when a man entered the garage of H. E. Skinner, in Boston, and stated that he wished to hire a machine to take him to Exeter, N. H., and back again to get the midnight train for New York. It was then 7 p. m. and Exeter was 65 miles away. The man wanted to get his son to take him home to see his mother, who was very ill, and there were no trains he could get. Mr. Skinner jumped into a big Pierce-Arrow and made the run, getting to Boston with about 5 minutes to spare. Not a stop was made.

School For Owners.—There is a training school for owners in Detroit. Every Tuesday evening the class meets at the factory of the Packard Motor Car Co. In fact, the Packard company established the school, which has now been running about 2 months under the direction of E. B. Finch, manager of the technical department of the Packard company. The class has increased at each session and now that it has two score of men prominent in Detroit's business and social circles, it has become quite a noteworthy feature of the local winter affairs. The work of the class is principally in the form of lectures, followed by general discussion. The course includes a thorough description of the Packard car and its operation, with many digressions into other lines concerning practical points in the use of motor cars. While the class was originally intended for Detroit owners of Packard cars, so much interest has been shown that the invitation has been extended so that members of the class may bring their friends, whether owners of Packards or not. On November 24 the procedure was changed in order to take advantage of the unusual opportunity afforded to see a large motor car factory working full blast at night. The Packard factory had been running nights for

some time and it was working at its utmost capacity in all departments, over 3,100 men being employed. The owners' class, which was swelled by the presence of friends and families of the members, spent over 2 hours going through the well-lighted plant. The occasion was of much more interest under the glamor of electricity than would have been a similar trip through the immense shops in the daytime. The purpose of the class was not neglected, as the different parts and assemblies which go to make up the Packard car were explained to the visitors and all of the different processes in their construction pointed out.

Baltimore After a Show.—Members of the Automobile Club of Maryland are in favor of holding a motor car show some time after the first of the year. This sentiment was expressed at the recent meeting of the club, when a committee, with Dixon C. Walker as chairman, was appointed with instructions to secure information concerning the best place and time to hold the show. While this favorable sentiment prevails among the club members many of the dealers are against holding a show at all. They argue that all the latest styles of cars are shown at the big shows in Chicago and New York and that a local show is a useless expense and bother.

An Amusing Predicament.—George B. Coombs, a Boston chauffeur, had an amusing experience a few days ago when he undertook to deliver a car to a man at Augusta, Me. The new owner thought it would be cheaper to have the car driven over the road than ship it by freight, and he knew it would be delivered sooner, so he engaged Coombs to take it from Boston. Coombs started in the car over the road and on the way it began to snow. Not being dressed for such a trip the driver stopped at Kennebunk, Me., and procured a robe. His condition and the fact that he was not fully protected from the cold aroused the suspicions of the man who gave him the robe and thinking the car had been stolen he notified the Biddeford

Four Winds



FROM MINNEAPOLIS AND OVERLOOKING THE MINNESOTA RIVER VALLEY, ONE OF THE BEAUTY SPOTS OF THE NORTHWEST

officers. When Coombs reached that city he was arrested, and not until a lot of telephoning was done did Coombs regain his liberty.

After Dead Storage—Due to the fact that motor cars are used more extensively during the winter months than they were a few months ago, there is now considerable competition in efforts to get cars for storage. This is especially true in Indianapolis, where, until this year, rates have varied according to the size of the cars. The State Automobile Co., recently organized, has just come out with a statement that it will store cars, irrespective of size, for \$5 a month.

Conquers Tough Hill—Eliot B. Ware, one of the Boston salesmen for the Pierce-Arrow, gave a demonstration of hill-climbing in a 60-horsepower Pierce six-cylinder 1 day last week in Vermont that will be remembered for a long time by the residents of Windsor who saw it. He had delivered the car to a Boston man who was at Windsor, when he heard about the famous Slade's slide up which many cars started but failed to conquer, so filling the Pierce with seven people he drove it up over the hill without any bother. Some idea of the stiff grade may be gleaned when it is known that though the tank was nearly full of gasoline at one time the fuel did not flow to the carburetor.

Scale of Rewards—Here's a rather remarkable scale of rewards for thieves, culled from rewards published on billboards, in police stations and in the press of Rhode Island: Motor car thieves, Providence, R. I., \$50; chicken thieves, Jamestown, R. I., \$100; chicken thieves, Middletown, R. I., \$200; horse thieves, Scituate, R. I., \$300. The Motor League of Rhode Island got busy recently when so many cars began to be reported missing. One was that of Judge Lee. His car cost him \$6,500 and was whisked off to Canada and never has come back. So the league has offered a reward for the arrest and conviction of a thief, say one like Judge Lee's. Upon this announcement members of the Rhode Island club began to bring in re-

ports of rewards they had seen posted around the country side. The secretary was requested to look up the matter of rewards, and he prepared the foregoing scale of rewards. "The records," said one prominent Rhode Island motorist, "sure do make us out pikers."

Jersey Is Relenting—Philadelphia motorists are chuckling over the latest news from the sacred soil of Jersey. To the majority of them the Garden State has been a terra incognita during the past twelvemonth, as a result of the much-too-stringent motor car regulations in force. In the making up of touring itineraries, private owners have followed the example of the Glidden tour committee, and carefully sidestepped Jersey. The boycott was felt from the start, as witness the awful howls which ascended from the bonifaces of the various shore resorts as early, even, as the Fourth of July. Motorists frequently went miles out of their way to avoid Jersey, and a none-too-good year financially was made worse as a result of the refusal of the "good spenders" to allow themselves to be imposed upon. But now, when the approaching new year brings nearer the day when the state assembly will meet in annual session, all the opponents of the Frelinghuysen law are getting busy preparing to materially modify some of the severer sections of the statute.

Even State Motor Vehicle Commissioner Smith feels that something should be done to bring back the motorists, and is out with a suggestion that all makers, owners, representatives of the various motoring organizations—all persons interested in the game in any way—should meet in a conference for the purpose of determining just what amendments to the present laws are necessary to bring New Jersey's motor regulations nearest to the point at which they will meet the demands of all. The commissioner apologizes for the shortcomings of the present law, instances the fact that the state has for half a century been tinkering unsuccessfully with the railroad laws, and asks: "Isn't it reasonable to suppose that the

state should fall somewhat short of the ideal in the matter of motor legislation with only 5 years' experience?" All of which goes to show that when the motorists began to touch the pocket-nerve they struck the trail leading to a real remedy. The suggestion of Commissioner Smith is likely to be acted upon.

Minneapolis Club Activity—The Minneapolis Automobile Club has taken on a decidedly active air socially within the past 5 weeks. Christmas day open house was held at the club's spacious quarters in the Plaza hotel and hundreds of the members and their friends dropped in during the day. Arrangements have also been made to hold a series of entertainments on the first and third Tuesday nights of each month for members. Smokers, vaudeville entertainments and possibly some athletic exhibitions are also planned.

More Road Work Planned—In anticipation of a lively spring road campaign, State Highway Commissioner James H. MacDonald, of Connecticut, is busy preparing surveys and maps of proposed improvements. It has been found necessary to secure additional quarters for the highway commission in order that the winter work, upon which the success of spring operations so much depends, might be carried on without interruption. The state legislature meets in a short time and Connecticut's roads will, of course, during the session, be up for discussion.

Another Rambler Record—By making the round trip from Los Angeles to San Diego, Cal., by way of the coast route and returning by way of Escondido and Elsinore, in 10 hours 32 minutes, L. B. Harvey, driving a 32-horsepower four-cylinder Rambler roadster, beat by 45 minutes the time record established by a six-cylinder car and thereby regained possession of the Chanslor-Lyons perpetual challenge cup. The former record for the 330 miles was 11 hours 17 minutes, and the record made before by the same Rambler was 11 hours 31 minutes. The car made two round trips from San Diego to Los Angeles and has twice broken the record.

Air Mixtures for Gasoline Motors



BEFORE entering into discussion it should be here stated that whatever mention is made of the proportions of a mixture reference is made to the ratio by weight. Volumetric relations in such considerations

are confusing and tend toward misleading deductions. Chemical reactions involve a definite weight relationship between the active substances. Combustion is a chemical reaction, and, as such, requires just so many pounds of oxygen for the complete reduction of a certain number of pounds of a given fuel. The weights of the substances can bear but one ratio to each other; while the volumetric ratio of combination may vary almost infinitely, because the factors of temperature and pressure must then be dealt with.

If the maximum temperature of combustion and its minimum pressure are to be utilized in an engine cylinder, its structure must be such that the molecules of the combining substances are in the proper positions relative to each other, that is, each molecule of fuel closely surrounded by the correct number of oxygen molecules before the occurrence of the ignition spark. This calls for the finest possible division of the fuel and its most thorough mixing with the air.

The Real Carbureter

The accepted type of carbureter, taken together with its distributing manifold, forms a surface carbureter usually of quite small surface. The manifold walls form the real carbureter, and the device called the carbureter furnishes the fuel to that surface, from which any proper vapor that may exist in the final mixture is carried by the passing mixture of air.

By "typical carbureter" is meant a device in which liquid fuel is brought into contact with a moving column of air by the same pressure depression which causes the air to flow, i. e., it is drawn through a passage by the motor suction simultaneously with the influx of the air with which it mixes to form the explosive mixture.

In the "typical" device, fuel is carried by flowing air from the open end of a passage located in a region of pressure lower than that of the atmosphere to which the other end is open. Lowered pressure without a correspondingly lowered temperature tends to cause vaporization. It is undoubtedly true that vaporization starts at this point as soon as the fuel has fairly left the nozzle. The intensity of this action depends upon the extent to which the pressure is lowered. The pressure reduction about the nozzle may be taken at 5

By T. S. Tice

pounds per square inch, which value increases through the manifold to the valves until it reaches a value of 6 to 8 pounds with some six-cylinder engines.

Under carbureter conditions it is impossible to measure or even approximately estimate the extent of the vaporization, at the nozzle or through the manifold, due to this pressure reduction; but it is known to be very appreciable in its effect. It should be considered as a condition affecting vaporization, at the nozzle end but slightly, but to a much greater extent after the fuel has become suspended in the air.

Vaporization due to pressure reduction is distinguished from vaporization caused by the supplying of heat. In the former action, vaporization can become only partially complete, however far the process of reduction is carried, since the part of the liquid which vaporizes does so through the abstraction of heat from the remainder, which becomes constantly colder, until due to motor suction causes vaporization finally the temperature of the liquid is so low that vaporization ceases until heat is supplied from some outside source. Where vaporization is brought about entirely by heat from some outside source the degree to which it may be carried depends wholly upon the amount of heat supplied, since the temperature of the liquid is being constantly raised to or maintained at the proper point.

Distinction in Vaporization

In the carbureting device under consideration neither of the above processes is carried to the limit, nor goes forward alone and unmodified. They are called into action simultaneously. The reduced pressure with a lowering of the temperature, and the heat of the air tends to cause vaporization through a transfer of heat from itself to the liquid. Thus it appears that each of these vaporizing actions assists the other—the air supplying heat to the liquid as it is cooled by vaporization under reduced pressure, and the reduction in temperature due to pressure reduction facilitating the transfer of heat from the air to the liquid.

Within the temperature and pressure ranges available, the liquid must present, relatively, an enormous surface to the air if vaporization is to be sufficiently rapid. To this end the passage through which the liquid flows is so formed that the liquid is broken up into a spray by the velocity of its effluxion due to the difference between the pressures existing at the two ends of

the passage. The passage is important.

In any one carbureter the perfection of vaporization is proportioned to the fineness with which the liquid is broken up at the nozzle. The shortness of the time within which vaporization must be completed is what causes the above factor of fineness of division to enter. Since the heat transfer between the air and the liquid, or the passage walls and the liquid, is affected chiefly through the agencies of convection and conduction—the former implying a rapid agitation and relative motion between the particles of the two substances, and the latter the exposure by the liquid of the greatest possible surface areas—it is readily seen that the finer the fuel division at the nozzle the more rapid and complete will be the vaporization and the greater the homogeneity of the final mixture.

Fuel Division Usually Too Coarse

In the coarseness of the fuel division lies the chief failures of the typical carbureter. This has been proven again and again by any number of experimenters. Those who have constructed transparent mixing chambers for the observance of nozzle action have invariably found that the fuel left the nozzles as a solid stream or in heavy globules and irregular "chunks," not as a fine spray or mist, as it is supposed to do. Improved design and workmanship on the nozzle and needle valve parts will almost entirely overcome this poor action, with an increase in power output and fuel economy; but any nozzle form used will give a wet and sloppy discharge with low engine demands, even though a true spray may be delivered with increased demands.

Whatever form is given the nozzle, the effectiveness with which it can break up the fuel varies as the difference between the pressures at its two ends, and, as this pressure difference varies throughout the speed range of the engine, the fineness will also vary. At high engine demands the spray will be better and finer than in the low; but this is absolutely necessary, since the time allowance for vaporization is less and the quantity of mixture formed is greater.

The nozzle of average performance will, at medium engine demands, deliver a thin conical sheet of liquid. This liquid cone is torn away at its edge and carried on by the air column. Some of the fuel torn away is in small enough particles to be considered as spray or mist, and may be taken as contributing directly to the vapor content of the mixture; but the greater part sooner or later strikes some part of

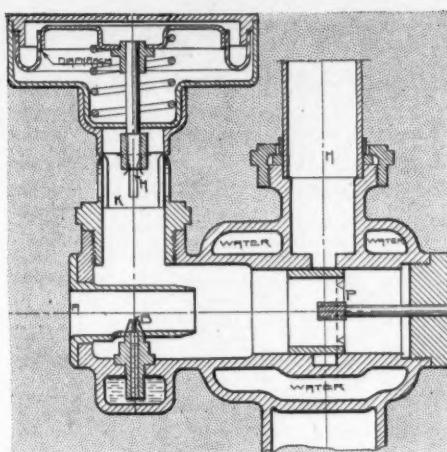
the containing walls, from which it is later picked up in the form of globules. These globules are continually picked up and thrown out by the air stream in its progress to the cylinders, until some of them are sufficiently small to become permanently entrained or have been completely vaporized.

Bends in the manifold passages aggravate the expulsion of the liquid globules, but they also permit of fuel once thrown out being readily picked up again. The persistence of rectilinear motion comes into play and throws out the heavier globules at the turns, they being again picked up by a following portion of the air column. This action is repeated at each of the turns.

In the foregoing it may seem that the vaporization accomplished by pressure reduction has been placed on a par with that brought about by the heat supply available in the air and passage walls. It is not meant that such an impression be taken. The rate of transfer of heat from the air and walls to the liquid will, of course, be higher the greater the temperature difference; the lowering of the pressure lowers the temperature of the liquid through partial vaporization, and thus increases the temperature difference. Thus, while vaporization could not go on at a proper rate without such a heat supply, the lowered pressure under which vaporization takes place is an important adjunct, second only to the heat supply.

Fuel Economy in High Velocities

The fuel economy resulting from the use of air velocities higher than the average, and thus lower pressures, is quite marked. Of course, with high charge velocities the maximum power is not realized above a certain piston speed; but the fuel economy



KREBS CARBURETER TYPE

and efficiency will be greater within the range which the high velocity device can supply without too great a loss per cylinder charge. This latter fact is easily demonstrated by making two series of runs with any multiple cylinder motor car engine. One series should be made with carburetor and manifold passages of such areas that an average charge velocity of about 8,000 feet per minute is had at a piston speed of 1,000 feet per minute; and the other series with passages which will give the average charge velocity at between 600 and 700 feet per minute piston speed.

A comparison of the two series of runs will show that up to that piston speed at which the volumetric efficiency of the engine pumping strokes falls off because of too high a charge velocity the power deliveries are approximately equal, the fuel consumption per brake horsepower hour and the thermal efficiency have each been improved. The passages giving the above

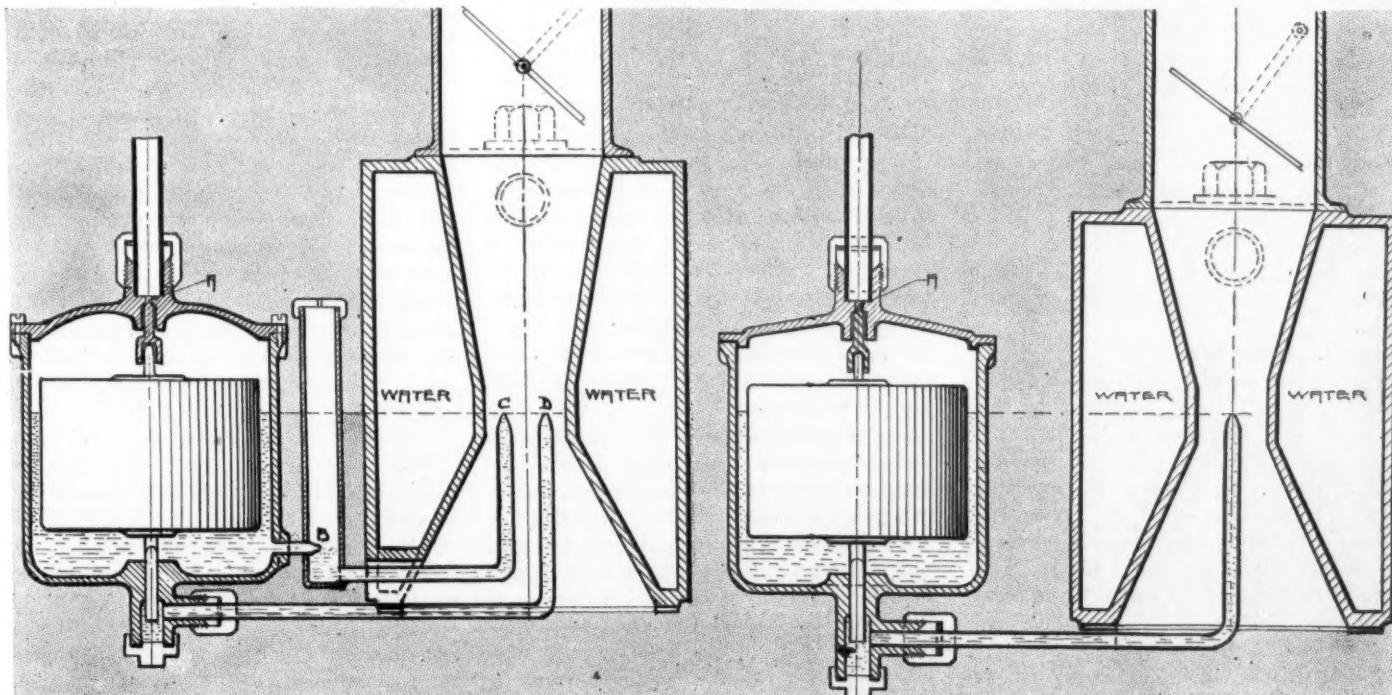
charge velocity at the higher piston speeds will permit of the development of a greater power at those speeds, and are thus superior from the viewpoints of maximum economy and efficiency at maximum output, which is the condition desired.

The points which it is desired to bring out are: that the greater the pressure drop in the passages the more perfect will be the breaking up of the fuel, the more rapid will be the agitation and internal motion in the mixture column, the greater will be the vaporization due to pressure reduction; and, as a final result, the fuel will be more thoroughly vaporized, and the mixture more homogeneous. There are in present practice several examples of the above utilization of high air velocities and low pressure in the carburetor passages. In the best of these the maximum charge velocity in the manifold and past the valves is kept down to the value given above—8,000 feet per minute; and the high velocities and low pressures are secured in the carburetor passages through several spraying nozzles, each located in a separate, small passage. These are put into communication with the manifold in a progressive manner in accordance with the engine demand; and thus practically constant, high air velocities and low pressures are maintained, no matter how many or how few are serving the engine.

The advantages possessed by such a device for the vaporization of the fuel are apparent, though it appears that these devices were primarily designed with a view to securing a more automatic proportioning of the mixture.

Heating Usually Necessary

If the nozzle and the conditions under which it operates are such that a true mist-like spray is delivered into the air column,



PRINCIPLE OF ZENITH CARBURETER

CHARACTERISTIC FLOAT FEED CARBURETER

no recourse need be had to air or wall heating devices providing the temperature of the air is 60 degrees Fahrenheit or higher. But, since such conditions very rarely obtain in practice, the expedient of heated air or jacketed mixing chamber walls must often be resorted to.

Because all liquid hydrocarbon fuels are variable and unstable, both their chemical compositions and physical characteristics, it is very difficult to formulate their actions or determine the best conditions under which to utilize them. Experimental data are placed at an equal disadvantage with mathematical and theoretical analyses in that the exactitude of either method is impaired by the non-uniformity of the substance. However, serviceable figures are entirely within reason; and as such the writer submits the following.

The hydrocarbon known as motor gasoline, specific gravity between .70 and .73, is a mixture of individual substances, each combining carbon C and hydrogen H in varying proportions. A small percentage of oxygen O is often present never to exceed 3.5 per cent., but, because of its smallness and sometimes total absence, it will be neglected. The several substances composing gasoline are all of the methane series, the chemical formula for which is expressed C_nH_m . This means that for the entire series, which comprises some eighteen substances, each combines C and H in the proportion of twice as many atoms plus two of H as there are atoms of C.

The first member of the series present in gasoline, pentane, C_5H_{12} , has a specific gravity of .626; the last member, decane, $C_{10}H_{22}$, has a specific gravity of .736. The other members between these two have specific gravities ranging between the two values given and corresponding to their increasing molecular weights. The second member of the series, hexane, C_6H_{14} , is the representative constituent of gasoline, being present in greater quantities than any of the others. Traces of petane or the members beyond nonane, C_9H_{20} , specific gravity .723, are seldom found in gasoline. Thus, hexane, though much lighter and more readily vaporized than the several heavier members occurring with it, should be used as the basis for any calculations. This use is justified by the high vapor pressure of hexane, as will be explained later.

Chemical Composition

Taking the chemical composition of hexane, C_6H_{14} , as that of gasoline, its combination with the oxygen of the air to form carbon dioxide, CO_2 , and water or rather steam, H_2O , may be expressed $2C_6H_{14} + 19O_2 = 12CO_2 + 14H_2O$. From the atomic weights of the elements involved, the weight of air necessary for the complete combustion of 1 lb. of C_6H_{14} is found as follows:

The atomic weight of C is 12, that of H is 1, and that of O is 16; thus the molecular weight of C_6H_{14} is $6 \times 12 + 14 \times 1 = 86$; and the weight of the combining oxygen

$19 \times 16 = 304$. Thus for the complete combustion of 1 lb. of C_6H_{14} , $304 / 86 = 3.54$ pounds

of oxygen will be required. Since 1 pound of dry air at $60^{\circ} F.$ and 14.7 pounds pressure contains only .23 lbs. of oxygen,

$3.54 / .23 = 15.39$ pounds of air are necessary for

the complete combustion of 1 pound of gasoline. This mixture proportion of 1:15.4 is known empirically to be that which will develop the highest temperature and pressure in a gasoline engine cylinder with a compression pressure of 70 to 80 pounds. Initial and Final Temperatures

An initial temperature of 60° will be sufficient for vaporization if the nozzle delivers a true spray. This will give a final mixture temperature which is considerably below the freezing point of water, and will thus cause a drying of the air through a condensation of the water vapor present. With perfect spraying and initial temperatures at $60^{\circ} F.$, vaporization is still far from instantaneous, and cannot be completed within the carburetor itself.

A temperature as low as $32^{\circ} F.$ would not be attained by the mixture within the carburetor and lower manifold, but would begin to be approximated only toward the upper parts of the manifold. The heat conducted from the cylinder by the passage walls is sufficient to obviate a mixture temperature of $32^{\circ} F.$ even during the latter part of the vaporization, which takes place quite close to the cylinders. With initial temperatures at 60° , a temperature of $34.5^{\circ} F.$ has been observed in a perfectly vaporized mixture just before its entrance to the valve pocket. This seems to show that the heat of the manifold walls entered into the action toward its latter part, and prevented freezing of water vapor while at the same time assisting vaporization. The engine was running at about 950 feet per minute piston speed at full load.

The lowest initial temperatures are determined by the fineness of fuel division, which is determined by several conditions, as mentioned above. If the division is imperfect, a greater heat supply will be needed in order that the vaporization may be complete within the limited time available; but the greater the heat supply, the better will be the mixture and the greater the power losses.

In the vaporization of fuel in spraying carburetors it is often found that no air temperature up to $120^{\circ} F.$ is efficacious in bringing about complete vaporization within the allowable time. In cases of this sort a change increasing the fineness of the nozzle delivery has always resulted in a more complete vaporization, and where the fineness of delivery has been progressively increased to a possible maximum value it has been found feasible to form a mixture, throughout the speed and power ranges, of

perfectly vaporized gasoline and air with an initial temperature of $58^{\circ} F.$

In a typical spraying carburetor the method of application for best results will depend upon the character of the fuel spray, upon the constriction of the mixing chamber, and the form of the manifold passages. If the division at the nozzle is fairly fine, the application of additional heat as an increased initial air temperature will, in general, be of the greater value. This is more particularly true if the carburetor and manifold passages are free from bends. If the passages are tortuous, a heating of the walls will assist vaporization with a less expenditure of heat, and will give an equally good mixture with a lower resultant temperature than will a heated air supply. If the nozzle delivery is very poor as regards division, heated walls will serve best.

The whole question as to which of the two methods is best for any specific case resolves itself into another question—with what is the liquid chiefly in contact after it leaves the nozzle? If the nozzle so divides it that it remains chiefly entrained in the air column, a heating of the air will give the best results; if the division is coarse, the liquid will be spread over the walls, and a heating of the walls will then be the better method, subject to the same condition of proper temperature maintenance. In conclusion on this matter of vaporization, it must be emphatically repeated that the extent to which fuel division is carried at the nozzle determines the temperature at which the mixture can be formed, and also its character referred to the degree of fuel vaporization and homogeneity.

Viscosity Lowered by Temperature

The foregoing considerations of temperature and heating effects apply solely to the matter of vaporization of the fuel. However, there is one direction in which temperature assumes a great importance as affecting mixture proportions, i. e., variations of temperature of the liquid fuel within the nozzle. Gasoline is commonly thought of as having a very low viscosity. This is true, but the viscosity of gasoline is lowered quite rapidly with temperature increases. The comparative weights of gasoline of .71 specific gravity flowing through the same passage and under the same pressure difference, with variations in temperature, are given in the following:

Weight in unit time.....	50°	59°	68°
Temperature $^{\circ}F.$	1	1.073	1.145
Weight in unit time.....	77°	86°	95°
Temperature $^{\circ}F.$	1.212	1.27	1.335

With the fuels of higher specific gravity the increase in quantity with increase in temperature is higher.

The above change in the weight discharged with change in temperature throws some light upon the tendency of carburetors supplied with heated air from a chamber about the exhaust manifold to lose their adjustment. With heated air supplied in this way, it has been repeatedly observed that the temperature of the air

entering the carburetor will vary as much as 30° F. under changing conditions of running, the surrounding atmospheric air being at between 70° and 75° F.

Since in most carburetors the greater portion of the nozzle is so placed as to be directly in this heated air column, it stands to reason that the temperature of the nozzle walls, and consequently that of the fuel flowing through, will follow that of the air with a difference of but very few degrees. If a constant initial air temperature could be maintained through the main air port, it would make no difference what temperature was employed; but with the exhaust manifold as the source of heat, is a practical impossibility, since its own temperature will vary from 300° to over 1,000° F.

Of course, the velocity of the air through the heating chamber will vary so that the higher velocities will be simultaneous with the higher temperatures, and this will tend toward constancy of temperature, but the relationship of the velocity to the temperature cannot be made such that a given temperature will be maintained to within more than 10° or 15° F.

Before proceeding to the heat necessary for fuel vaporization, it should be determined at what lowest temperature the proportion of 1 of fuel to 15.39 of air, as above, can be maintained. There is a definite limit to the amount of vapor that can exist in a unit volume of mixture at any given temperature. If the vapors of such substance be treated as gases, because of the then great expansion, the weight of fuel vapor present at any one temperature is proportional to the vapor pressure of that substance at that temperature.

Thus, the amount of gasoline vapor that can exist in a unit volume is measured by the vapor pressure of saturation for that temperature. That is, if air be saturated with gasoline vapor at a certain temperature and pressure, a lowering of the temperature the pressure remaining constant will cause a condensation of some of the vapor, and consequently an impoverishment of the mixture. To apply this:

Densities Proportional to Weights

Since the densities of gases are proportional to their molecular weights at the same pressure and temperature, and the molecular weight of H is 2, that of gasoline being taken as 86, the density of gasoline vapor is to that of H as 85 : 2, or is 43 compared with 1. Therefore the vapor

pressure of 1 pound of gasoline vapor is — 43

that of an equal weight of H occupying the same volume. Also, the density of air is 14.44 times that of H; and thus 15.39

pounds of air has vapor pressure of — 14.44

times the vapor pressure of 1 pound of H occupying the same volume.

Hence the pressure of the gasoline vapor in a mixture of the proportion 1 : 15.39 is

to that of the air in the mixture as 1 15.39
— = —, or as .0233 : 1.065; from this
43 14.44

1.065

ratio it follows that — or .9786
.0233 + 1.065

is due to the air in the mixture. If the mixture is under atmospheric pressure of 14.7 pounds per square inch, there will be exerted by the gasoline vapor a pressure of $.0214 \times 14.7 = .315$ pounds. Tables of vapor pressures show that gasoline vapor can exert a pressure of .315 pounds at all temperatures above 1.5° F.

It appears that gasoline-air mixtures of 1 : 15.39 can exist at or above 1.5° F. under atmospheric pressure. If the pressure is less than atmospheric, or the ratio of fuel to air is decreased—it will be about 1 : 17 or 18 in average practice—the mixture will persist without a condensing out of any of the fuel vapor at temperatures lower than 1.5° F.

Value a Little High

In the above determination of the temperature referred to fuel vapor pressure, the value given is a little high. Only the vapor pressure due to the hexane is there considered. While hexane is the characteristic of gasoline because of its occurrence in great quantities, the total vapor will be the sum of the vapor pressures of the various substances taken at the given temperature. Thus, the two pentanes—iso and normal— C_5H_{12} , though usually present in insufficient quantities, having higher vapor pressures than the hexane, will tend to raise the vapor pressure, at a given temperature, above that due to the presence of hexane alone. Likewise, the constituents of gasoline heavier than hexane—heptane, octane and nonane—contribute in some part to the total vapor pressure. From this it appears that any error that may be introduced, by the assumption that the vapor pressure and other characteristics of hexane are those of gasoline, is toward an overestimation of the temperature, and will thus fail to effect the results.

The specific heat or amount of heat measured in B.T.U.—British thermal units—necessary to raise 1 pound of gasoline 1° F. is .500. Hence a drop of 1° F. in the temperature of 1 pound of gasoline corresponds to the dissipation of .5 B.T.U. The specific heat of air at constant pressure is .2375; and a drop of 1° F. is attended by the dissipation of .2375 B.T.U. per pound of air. Taking the mixture proportions as 1 : 15.30, as above, the heat available per ° F. of drop in temperature of the mixture is $1 \times .500 + 15.30 \times .2375 = 4.155$ B.T.U.

Must Have Ingredients

Since the latent heat of vaporization is very approximately 210.5 B.T.U., it follows that this 210.5 B.T.U. must be supplied by the ingredients or by heat from some outside source applied directly to the fuel.

Consider the heat supply in the mixture ingredients themselves. Since the mixture,

1 : 15.39, is capable of supplying 4.155 B.T.U. per ° F. of drop, it will require a 210.5

drop of — = 50.66° F. in the mixture to 4.155

completely vaporize the 1 pound of fuel contained therein. The mixture, 1 : 15.39, cannot exist below 1.5° F., so it will be necessary that both the air and the gasoline have a temperature of at least $1.5 + 50.66 = 52.16$ ° F. before the commencement of vaporization. If the mixture is 1 : 18, it can exist at —5.8° F., and the initial temperature of the ingredients must be at least 38.3° F.

If the requisite amount of fuel and air are placed in a vessel insulated from outside heat, the above initial temperature values will hold only when the time allowance for vaporization is unlimited. Compared with the short time in which vaporization must be completed in an automobile engine, the passage of time before vaporization would be completed would be almost infinity. However, there are three methods whereby the rate of vaporization may be accelerated: either the fuel may be introduced in a finely divided form; or the initial temperatures of the mixture may be made higher than the above values; or a combination of both methods may be employed.

In any case, the temperature drop can be no more than 45° F. in any mixture of gasoline and air. Therefore, if an increase in initial temperature is resorted to, the final temperature will be higher than that necessary to support the mixture proportions by just the amount that the initial temperature is raised. Suppose an initial temperature of 100° F. and a drop of 45° F. The resulting final temperature in the mixture will be 55° F.

In consideration of the form in which the fuel is presented to the air in the average carburetor, this final temperature will be higher than 55° F. because the total amount of fuel will not have been vaporized, and the amount of heat necessary to complete the vaporization will remain in the mixture as a temperature value. But suppose the vaporization to have been completed in two cases with a final temperature of 55° F. in one and 1.5° F. in the other. Since the same amount of fuel is present, the volumes per pound of the two mixtures, at the same pressures, may be taken as bearing the same relationship to each other as the volumes per pound of dry air at equal pressures and the two temperatures given. Thus, the ratio of volumes per lb. of mixture may be expressed 1 : 88, for the two mixture temperatures of 1.5° and 55° F. respectively. Therefore an engine can aspirate only .88 the amount by weight of 55° F. mixture as can be aspirated of the 1.5° F. mixture. In fact, the loss in weight of charge will be greater.

The power of an engine varies as the weight of charge burned per power stroke, therefore the power delivery will be greater with a lower mixture temperature.



Among the Makers and Dealers



Take State for Moline—M. L. Waite, 271 Oregon street, Milwaukee, Wis., has been appointed agent for the Moline line for Wisconsin.

Whiting District Manager—C. L. Whiting, of Rochester, has been appointed district manager of the Buick Motor Co.'s branch in Buffalo. He is the company's agent in Rochester.

Kansas City Change—Henry Holzhauer has formed a company to handle the Pope-Hartford in Kansas City. The details will be announced as soon as a location has been secured on Grand avenue. Nick Hall now represents the Dorris in Kansas City.

Garage for Twin Cities—D. F. Poyer, of Menominee, Mich., has awarded contracts for the erection of a \$7,000 garage to supply Marinette, Wis., and Menominee, Mich., the twin cities. It will be two stories high, of brick, in classic style, and fireproof.

Watertown's Latest—The name of the new Rambler agency at Watertown, Wis., is the Copeland-Roach Motor Co. The partners are Theodore B. Roach, assistant manager of the Rambler Garage Co., of Milwaukee, and W. F. Copeland, Rambler agent for Jefferson county, Wisconsin.

Denver After Taxicabs—Denver will soon have taxicabs on its streets. The Denver Taxicab Co. has been incorporated with a capital of \$20,000. Frank A. Austin is president, F. W. Reynolds vice-president and R. J. Reynolds, secretary, treasurer and manager. The company has ordered five taxicabs which will be delivered early in January.

Bus Line Prospering—The Cortland Transfer Co., of Pittsburg, has not lost any business because of winter weather. Its line of motor buses running from Cortland, O., to Warren, O., which was established last August, has proven so popular that since the holiday trade started extra trips have been run Saturday afternoon and evening to accommodate the farmers in that section who use the buses to visit the county seat.

Kansas City Show Dates—Arrangements for the motor car show of the Kansas City Automobile Dealers' Association are already under way. The dates are March 8-13 and the place Convention hall. A number of new agents were admitted into the association and a general promise of big displays was made. This committee was appointed to handle the show: W. S. Hathaway, district manager Maxwell-Briscoe, chairman; Fletcher Cowherd, Jr., of the firm bearing his name; H. E. Rookridge, Missouri Valley Auto Co.; C. C. Meade, manager of the Ford branch; W. L. Walls, with Buick branch. Rookridge,

Hathaway and Walls were on the show committee last year and have had the experience which will make their task this year easier.

McKinnon Made Manager—James M. McKinnon has become manager of the Auburn avenue garage of Buffalo. He is also agent for the Selden.

Oshkosh Incorporation—The F. S. Hoagline Auto Co. has been incorporated at Oshkosh, Wis., with a capital stock of \$100,000, by E. S. Hoaglin, A. E. Badger and L. O. Chase. F. S. Hoaglin has been agent for the Rambler line for 2 years.

Busy at Bowling Green—The Gramm-Logan Motor Co., recently organized at Bowling Green, O., is running night and day to keep up with its orders. The plant recently has been in operation on Sundays as well and the boom seems to be on the increase rather than showing signs of decrease.

Pittsburgher in Denver—Dr. A. C. Lee, long connected with the Pope lines in the east, and for the last 2 years manager of the Colonial Automobile Co., Pittsburgh, Pa., representing the Apperson, Pope-Toledo and Baker electric, has associated himself with the Tobin Motor Car Co., of Denver, Colo., and will sell Peerless and Apperson cars in that city.

Big Garage Planned—The Anderson Vehicle Co., of Fond du Lac, Wis., will erect a \$20,000 garage this winter. It will be the largest in Wisconsin outside of Milwaukee, and will be known as the Travelers' Home garage. The motor car end of the company's business has superseded the vehicle end, and the new building will be devoted almost exclusively to motor vehicles. There will be two elevators and a crane.

Fisher Has Maxwell Again—Arrangements have been completed by the Fisher Automobile Co., Indianapolis, to represent the Maxwell in Indiana again next season. For a time there was some doubt as to whether or not the agency would be renewed. The Hearsey-Willis Co., of the same city, has arranged to handle the Waverley line of electric cars in Indianapolis next season in addition to lines previously mentioned.

Big Rambler Business—It was prophesied a year ago by the Rambler people that the year of 1908 would be the greatest in the history of their business. That this prophecy was right is shown by the statement of the company that during July, 1908, the sales were 65 per cent larger than in July, 1907; in August they were 175 per cent greater; in November the increase was 520 per cent over the same month of the preceding year, while in the first 5

days of December the entire sales record for the month of December, 1907, was surpassed.

Buick Manager Resigns—H. Nelson Dunbar has resigned as manager of the Buffalo branch of the Buick Motor Co. He has well formulated plans for the future.

New in Janesville—The Pierson Garage Co., of Janesville, Wis., has filed articles of incorporation. Capital stock, \$10,000. The incorporators are Roy Pierson, N. L. Carle and L. A. Avery.

Cooper Made Manager—Harry W. Cooper, associated with the Chicago retail branch of the Excelsior Supply Co., has been made sole manager of the Michigan avenue store. Formerly the establishment was run under two managers, of whom Cooper was one.

Two Olds Agencies—The Du Bois Auto Repair Co., of DuBois, Pa., will represent the Oldsmobile in that town and the Johnstown Automobile Co. will handle the business of the Olds in Johnstown the coming year. Both agencies were placed through the Pennsylvania branch house of the Olds Motor Works.

Hartford Concern Expanding—Brow, Thomson & Co., distributors of the Packard, Stevens-Duryea and Cadillac, at Hartford, Conn., have acquired property adjoining its own on Temple street. In the near future it is expected that an addition will be erected which will take care of the motor car end of the firm's business.

Another Blow at Horse—The Milwaukee Electric Railway and Light Co., of Milwaukee, has remodeled an old touring car into a "trouble" wagon, and its success will mean the replacement of all the company's horse-drawn repair wagons by motor vehicles. This company is under the same ownership and management as the Union Electric Railways Co., of St. Louis.

New Railroad Runabout—Arthur S. Lanicich, of Baraboo, Wis., has invented a new type of railway motor runabout, the first being used successfully by Roadmaster L. C. Ryan, of the Madison division of the Chicago and Northwestern railroad. The car has a 3-horsepower, two-cycle motor, weighs 200 pounds and is equipped with solid rubber tires on flanged wheels. A patent has been applied for.

Gets an Injunction—The Johnson Service Co., of Milwaukee, manufacturer of the Johnson gasoline car, has secured an injunction restraining the city of Milwaukee from purchasing a Locomobile for use of the police chief on the ground that the contract was not opened to the general manufacturers and bids called for. The Milwaukee board of public works selected the Locomobile after experimenting

with eighteen other makes without the formality of asking sealed proposals. It is believed that the difficulty will be amicably settled.

Garage for Oconto—The Lucia Cycle Co., of Oconto, Wis., is about to erect a \$5,000 garage and salesrooms. The building will be ready for occupancy about April 1, 1909.

After an Agency—J. J. McInnis, who drove the Reo pilot car in the Glidden tour, now is established at Muncie, Ind., running a garage at 421 East Main street. He is seeking the agency for a two or a four-cylinder car.

Stevens in Wisconsin—The Stevens-Duryea will be represented for the first time in Wisconsin after January 1, when the Akin Motor Car Co. opens its new garage. The company has temporary headquarters in the Bland-Mueller garage, Fourth and Prairie streets, Milwaukee.

Locates in Neenah—The Auto Supplies Co., of Neenah, Wis., has been incorporated with a capital stock of \$10,000, to deal in sundries, parts, supplies, tires, etc. The headquarters are at 111-113 South Commercial street, Neenah. F. E. Ballister is president and F. A. Leavens is secretary and treasurer.

Two More Stories Needed—The Pence Auto Co., of Minneapolis, which is planning the erection of a six-story building on Hennepin avenue, announces that two stories will be added to the building. This was found necessary to handle the demands of this company as northwestern distributor of the Buick and Stevens-Duryea. Work has been started on the building, which, according to the amended plans, will cost close in the neighborhood of \$140,000.

Garages Consolidated—The Worthington-Clark Automobile Co., of Fond du Lac, Wis., has filed articles of incorporation. The capital stock is \$20,000 and the incorporators are George W. Worthing, E. W. Clark, Anton Hoenisberg, John W. Immel and G. H. Stanchfield. The company is a consolidation of three leading garages and agencies at Fond du Lac, which suffered the destruction of their buildings in a recent \$250,000 conflagration. The company is building a \$15,000 garage. It will handle the Jackson and other makes.

St. Louis Show Plans—The third annual show of the St. Louis Automobile Manufacturers' and Dealers' Association will be held in the new Coliseum building at Jefferson and Washington avenues, February 15 to 20 inclusive. There is about 40,000 square feet of floor space available for exhibits. The manager of the show, just appointed, is Lloyd Rickert, secretary of the American Baseball Association. The show committee, which will direct Mr. Rickert in his work is made up of John J. Behen, of the Behen-Faught Motor Car Equipment Co.; H. B. Krenning, of the Dorris Motor Car Co.; W. C. Anderson,

manager of the Ford branch; Samuel Braden, of the Western Automobile Co., and O. L. Halsey, of the Halsey Automobile Co., who is president of the association.

New Canadian Concern—A company known as the Britnell Motor Car, Limited, has been organized with its head office at Toronto, Ont. The concern has a capital stock of \$60,000.

Another Recruit—Another implement firm has entered the motor car field, the LaCrosse Implement Co. of Minneapolis, having closed for the Jackson line through the northwest.

Becker Moves—Sherburn M. Becker, former mayor of Milwaukee, who is Wisconsin agent for the Stepney spare wheel, has removed his offices from the Iron block, Wisconsin and East Water streets, Milwaukee, to the Wells building, Wisconsin and Milwaukee streets.

Canada's Show Dates—The third annual motor car, motor boat and sportsmen's show will be held in the St. Lawrence arena, Toronto, February 18-25, under the auspices of the Ontario Motor League. For the benefit of exhibitors from foreign countries the exhibition building will be a bonded warehouse so that goods coming from there will be duty free.

New Great Western Agencies—The Model Automobile Co. announces the following new agencies established: Mary E. Carlton, Rochester, N. Y.; Bennett Mfg. Co., Alden, N. Y.; W. H. Collins, Newfane, N. Y.; B. L. Colaw, Kansas City, Mo.; A. Burhyte, Waterloo, Ia.; William Ott, Freeport, Ill.; T. H. Graswick, Calgary, Alberta, Canada; J. H. Santee, Goltry, Okla.

Patterson a Ramblerite—George Patterson, Reo and Premier agent in Cleveland, O., for the past 2 years, is a convert to the Rambler ranks, and he is now Cleveland branch manager for the Kenosha concern. The Rambler branch is now being established, superseding the agency of T. C. Whitecomb. The Reo and Premier agency is to be continued at the same place on lower Euclid avenue under a new management, Patterson having sold his interest some weeks ago.

Prosperity in Northwest—Throughout the northwest territory prosperity seems to have the call and as an indication of this comes the news of the erection of two comparatively expensive buildings by dealers in small cities and towns. At Minot, N. D., E. F. Tompkins, agent for the E-M-F and Maxwell, has just completed a \$5,000 building to be devoted to the selling and repair ends of the business. At Aberdeen, S. D., F. W. Boettcher has decided to get into the business and he will erect a \$10,000 building and plant which will be the home of the Maxwell and Buick lines and which will also offer the residents and tourists expert garage services. This will be kept open day and night. At various other points throughout Minnesota and the

Dakotas there are new buildings being planned and a general prosperity wave seems to be actively engaged in stirring up the interest in the trade generally.

Motor Hospital Started—The Pittsburgh Automobile Hospital has been opened at 5912 Baum street, Pittsburgh. The proprietors are Wainright & Bratton.

Grabowsky Company Incorporated—The Grabowsky Power Wagon Co., of Buffalo, has been incorporated with the following directors: James D. McDonald, John F. Valley and John Moore.

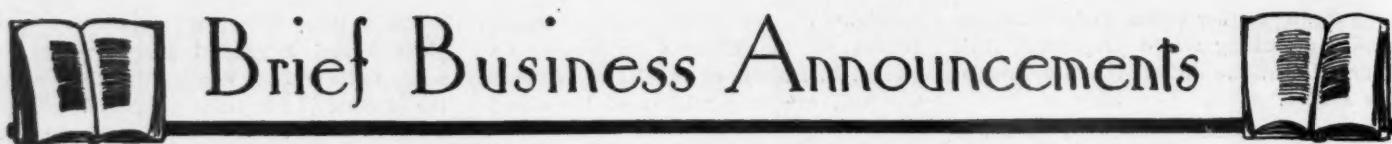
Takes Magneto Agency—The Bland-Mueller Auto Co., Milwaukee, has been appointed state distributor for Wisconsin of the Volta magneto by the Witherbee Igniter Co., of New York. Mark W. Heath, of Chicago, has joined the Bland-Mueller company.

Loco Branch Moves—The Locomobile branch in Boston is now housed in its new quarters at 589 Boylston street, where it has for neighbors the public library, art museum and Trinity church, the location one of the finest locations in Boston, being readily accessible from all points.

With New York White Branch—H. K. Sheridan, who has driven the White steamer in a number of important reliability runs, has accepted an offer from Manager George W. Bennett to become superintendent of the New York branch, and he will hereafter be in charge of the garage and repair shop.

Rowland's Will Continue—The Rowland Advertising Agency has been duly organized and incorporated under the laws of the state of New York, with a capitalization of \$12,000, all of which has been fully paid. This corporation has acquired all the assets of every kind and nature of the business formerly conducted by the late John B. Rowland, and has also assumed all the liabilities of the former business. Clarence O. Sacks is the president and treasurer of the corporation. Eugene F. Kinkade is the secretary and also a director of the company.

Pope Officials Elected—A meeting of the directors of the reorganized Pope Mfg. Co. was held in New York city and the following officers were elected: Chairman of board of directors, Harry Bronner; president, A. L. Pope; vice-president, Charles E. Walker; treasurer, Colonel George Pope; secretary, Wilbur C. Walker; assistant treasurer, Ezra M. Cutting; general counsel, Joline, Larkin & Rathbone. The new company has authority to take over the properties of the old company on the payment of the debts of the old concern and the transaction of this is being accomplished with all possible dispatch. The new concern is practically running under its own officers. A petition of the receivers of the old company will be filed in the court of chancery at Newark for permission to make the final payment or fourth of the dividend of 25 per cent.



Brief Business Announcements

Santa Ana, Cal.—D. J. Bastanchury has taken the agency for the Elmore in this city.

Boston, Mass.—B. N. Crockett has joined the staff of the local branch of the Studebaker company.

Johnstown, Pa.—The Johnstown Automobile Co. has been appointed local agent for the Oldsmobile.

Artesia, N. M.—Schenck Brothers, of the Artesia machine shop, are planning to erect a garage at Fifth and Main streets.

DuBois, Pa.—The Oldsmobile company has closed a contract with the Dubois Automobile Co. for the representation of its car in this city.

Auburn, Ind.—The new factory of the Zimmerman Mfg. Co. is now completed, and the company is engaged in the manufacture of motor buggies.

New York City.—The Howard & Co. Auto Exchange has leased quarters at 1,666 Broadway and will handle high grade cars, both foreign and domestic.

St. Louis, Mo.—The Maxwell-Briscoe Motor Vehicle Co. is to erect a new garage next to the American Garage Co.'s building at 5123 Delmar avenue, to cost \$15,000.

Wilkinsburg, Pa.—The Matheson Motor Car Co. held its annual meeting last week and elected J. B. Russell, of this city, a director, to succeed C. P. Stegmeier, who has resigned.

Chicago, Ill.—The Knox Automobile Co. has removed from 1208 Michigan avenue to 1458, where it has secured the entire building. The structure is to be known as the Knox building.

Sacramento, Cal.—R. N. Day, of Placerville, is endeavoring to make arrangements with Arnold Brothers, of this city, to conduct a garage in Placerville. Arnold Brothers have a large garage here.

Marshfield, Ore.—William Wade and Thomas Goodale, of this town, are about to start a motor bus line from here to Roseburg, a distance of 65 miles. They have bought three Thomas cars, which will be used on the route.

Indianapolis, Ind.—The Hearsey-Willis Co., of West Market street, is going out of the carriage business, and in the future will devote its entire attention to the motor car and bicycle business. The company has recently secured the local agency for the Waverley.

Los Angeles, Cal.—George W. Shugars, who has been the manager of the Durocar company, which is located on South Los Angeles street, has resigned his position and has also retired from the directorate of the company. For the present W. H. Pendleton will act as manager of the fac-

tory, while the duties of sales manager will be looked after by Walter Sahland.

Allentown, Pa.—The Lawfer Automobile Co. has been appointed agent for the Chalmers-Detroit.

Topeka, Kan.—The Star Automobile Co., of Wichita, has been incorporated with a capital stock of \$16,000.

Syracuse, N. Y.—The addition to the Franklin factory has been completed, and the engineering department is now located in its new quarters.

Toledo, O.—Owing to the reorganization of the Pope Mfg. Co., F. C. Gilbert, of this city, has handed in his resignation, to take effect on January 9.

Council Bluffs, Ia.—H. A. Van Brunt has finished the alterations in his garage on Fourth street and expects to be located in his new quarters by the end of next week.

Atlanta, Ga.—The Maxwell-Briscoe Southern Co. has outgrown its present quarters and will at once commence work on the erection of a new garage next door to 34 Auburn avenue, where it is located now.

Allentown, Pa.—The Hamilton Automobile Co. has taken over the property which has been controlled by the Hamilton Realty Co., and the new corporation will represent the Ford. The Hamilton Automobile Co. has absorbed the realty company and, while some of the members of



Summit, N. J.—Summit Motor Car Co., capital stock \$5,000; incorporators, H. H. Day, R. Nelson and H. Baldwin.

Hartford, Conn.—Pope Mfg. Co., capital stock \$6,500,000; incorporators, Albert L. Pope, George Pope, Charles E. and Wilbur C. Walker.

Portland, Me.—F. & D. Mfg. Co., capital stock \$400,000; to do a general motor car business; president, C. R. Eaton; treasurer, T. L. Croteau.

Medford, Miss.—West Medford Automobile Co., capital stock \$20,000; to do a general motor car business; incorporators, A. E. Kenny, C. E. Hall.

New York—Moto Bloc Import Co., capital stock \$5,000; to manufacture, deal in and rent motor cars; incorporators, H. M. Browne, F. W. Mills and E. J. Forham.

Trenton, N. J.—Sharp Arrow Automobile Co., capital stock \$125,000. W. H. Sharp is to be president and general manager; F. W. Bennett, secretary, and I. D. Farlee, treasurer.

Brooklyn, N. Y.—Prospect Heights Auto Co., capital stock \$125,000; to manufacture motor cars; incorporators, R. F. Kelly, P. F. Reilly, L. H. Howard.

New York—Eureka Taximeter Cab Co., capital stock \$25,000; to manufacture, deal in and rent motor cars; incorporators, H. M. Browne, F. W. Mills.

Wilmington, Del.—Morgan Motor Car Co., capital stock \$500,000; to manufacture and deal in motor cars and supplies; incorporators, E. L. Squier, K. M. and J. A. Byrne.

the latter concern retain their interest in the new organization, the majority of the shareholders have sold out.

Los Angeles, Cal.—The Central Motor Car Co., of this city, has been incorporated with a capital stock of \$25,000.

Newark, N. J.—The Oldsmobile Co., of New York, has established a branch in this city at 88 Washington street.

Philadelphia, Pa.—W. H. Schofeld & Son have secured the property at 250 South Camac street, and have opened the New Camac garage.

San Diego, Cal.—M. C. Fenner, Los Angeles representative of the White, has leased Coronado garage and will open an agency for the White.

Baltimore, Md.—The Zell Motor Car Co. is about to erect a new three-story garage on Mount Royal avenue, between St. Paul and Charles streets, at a cost of \$50,000.

Boston, Mass.—The Locomobile Co. of America, which has been located at 400 Newbury street, has secured permanent quarters at 589 Boylston street.

St. Louis, Mo.—The Colonial Automobile Co. is making numerous changes in its garage, and has moved its offices to the second floor, thus affording more room for show purposes.

Harrisburg, Pa.—The Central Pennsylvania Automobile Co., local agent for the Franklin, has taken over the old skating rink on Chestnut street, and is fitting it up as a garage and salesroom.

Atlanta, Ga.—The Alexander-Seewald Co. has been appointed agent for the Franklin. The Alexander company is removing from its former quarters at 91 North Pryor street to the Commerce Hall building, at Edgewood avenue and Pryor street.

Burlington, Wis.—The Automobile Supply Co. is erecting a brick garage on Chestnut street, which will give a floor space 120 by 65 feet. It will be ready in February. The company handles new and second hand cars as well as supplies and accessories.

Sag Harbor, L. I.—The heirs of John M. Hildreth have sold to George Kiernan, representing William Blaiklock, three lots on lower Main street. Blaiklock is to start a machine shop and garage, and will commence work on the erection of a brick block very soon.

Boston, Mass.—The Auto Motor Co. is to establish headquarters at 11 and 12 Park square. M. N. Dykeman and James Nelson are to be connected with the company, and will look after the interests of the Pennsylvania, while George Lowe is to handle the Gyroscope.

An Industry's Progress of a Decade

By
Thos. J. Fay

THE mother of invention should be mighty fond of the most youthful of her progeny, the automobile; as well she may. A decade ago the motor-driven car was but the dream of pioneers, out of which they awakened to be smote by the sunlit dawn of a new era. To scan the horizon of human endeavor but a few years ago would have disclosed the automobile as the merest speck, shrouded in mystery, and stayed by prejudice.

It would be to dip deep in the brine of lore, therein to find a theme wonderful in its ramifications, with never a chance of reflecting the splendid possibilities the future holds for this geocentric product, vastly portraying the genius of man.

With an abiding faith in the future of the automobile, considering well the dizzy height attained, the treacherous pathway, and the stragglers that ever bestrew the onward march of progress, it will not be amiss to render up an accounting of the assets, to countermarch that splendid galaxy, and thereby to lend confidence to such further efforts as progress dictates, egged on by necessity.

A résumé of current events, something by way of encouragement, and a stray remark, will scarcely be too much. In the pages to follow, then, the aim will be to discuss the automobile as it is, with perchance a reflection or two portraying the future trend and a resting place for mile stones.



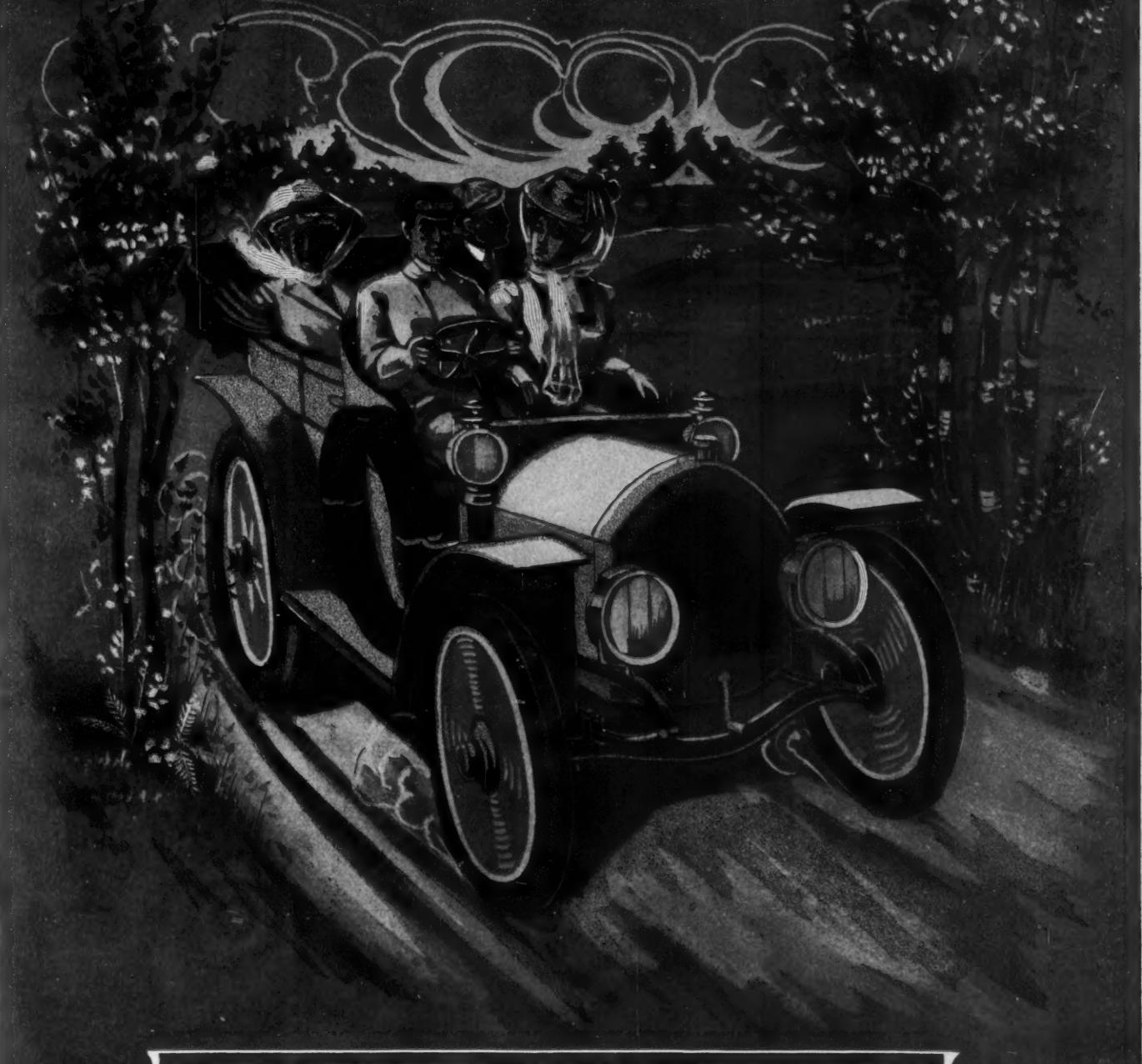
The Readers' Clearing House

The attention of Motor Age readers is invited to the pages of the Readers' Clearing House, a weekly department of from two to four pages in which questions by readers are answered in a technical, or semi-technical manner as the occasion demands, and in which criticisms and comments by readers are printed. This department is conducted expressly, as its name suggests, for the benefit of readers who have opinions to express on every phase of motor car construction and every aspect of motoring topics. It is intended as much for the garage man, as the car owner. These columns are always open to suggestions along new avenues of thought in motor car design or usage. All communications to it must be properly signed, which signatures will be published unless requested otherwise. Communications should reach Motor Age office not later than Tuesday noon of each week in order to appear in that week's issue.

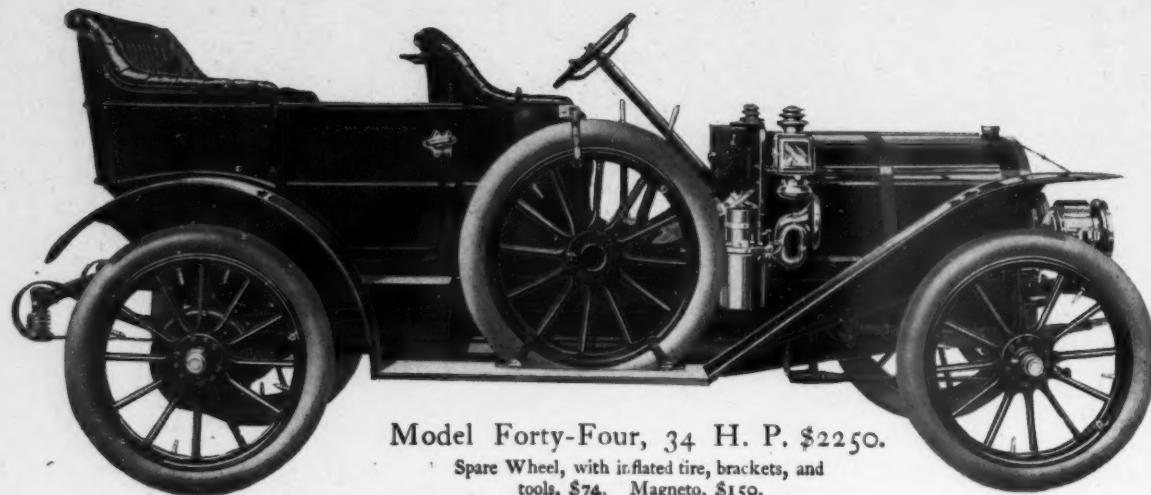
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Light and Standard Designs, in Shaft and Side-Chain Drives.



Model Forty-Four, 34 H. P. \$2250.

Spare Wheel, with inflated tire, brackets, and tools, \$74. Magneto, \$150.

Rambler

NEW YORK EXHIBIT

Have you seen the Rambler Spare Wheel operated? It can be substituted for the regular wheel within three minutes.

We invite every one who is interested to call at the Rambler show, 38-40 W. 62nd St., and see the demonstrations of this exclusive Rambler feature.

Such exclusive features as the offset crank shaft and straight line drive which have contributed so much to the satisfaction given by the new Ramblers during the past year, will also be explained.

The line now includes some new models never before shown, that will interest dealers in open territory. No other make at anywhere near Rambler prices approaches them in class and exclusive features.

During all New York shows Ramblers will be shown and demonstrated at the new Rambler Branch, 38-40 W. 62nd St., New York. Telephone Columbus 4511; give your address and we will call for you.

Thomas B. Jeffery & Company
Main Office and Factory, Kenosha, Wis.



Some Features of Touring Cars.

FORMERLY it was taken for granted that an automobile seating more than two passengers constituted the essentials of a touring car. No attention was paid to the question of the power plant, the strength of the *chassis*, or the accommodations for passengers beyond the seating capacity. It was not uncommon to note a single-cylinder motor mounted in a light frame, on wheels of small diameter, with a body for five passengers weighing more than all the rest of the car combined.

The present trend of the industry is in the direction of the harmonious relation of the *chassis*, power plant, and the line of markation between strictly runabout types and touring cars. The runabout types are highly developed, specialized cars, serving definite ends, and are of sufficient importance to entitle them to a separate discussion.

Light Touring Cars

Instead of overburdened runabouts, we have today light touring cars, differing from the standard touring products only in that they are equipped with motors less powerful and fitted out with bodies to seat five passengers. The light touring cars of the present time are more commodious by far than the imported creations of two or three years ago, masquerading as touring cars and all the rage. These light touring cars, in some cases, have a wheelbase of 110 inches, seat five passengers comfortably, and are superior in every way to anything by way of a touring car of two or three years ago. The relation of the ability of the power plant to the total weight is nicely adjusted in that the motors are of the four-cylinder conventional types rated at from 20 to 30 horsepower, as a rule. The total weight of these cars is well within a gross ton, in the most severe examples, and with increasing weight it is customary to increase the power of the motor, holding in nearly every case to the ratio represented by at least one horsepower to one hundred pounds of total weight. These same light touring cars are provided with wheels of more liberal diameter than were wheels heretofore, and it will not be out of place to state that increasing the diameter of the wheels within certain limits is equal to increasing the power of the motor.

While it is true that the shaft drive is very predominate in light touring cars as they obtain today, this is not to be construed as indicating any stricture on the side-chain ability, since in all truth, both methods are well represented in the cars of the subject and both methods are competent. In the cases involving the side-chain it is not necessary to take into account the angularity, and a point to be made here is that in the shaft-drive cars of the present time the propeller shaft is long and the angularity of the drive is substantially zero under normal conditions of operation.

The universal joint is in every case protected from dust, and in nearly every case provision is made for lubrication, so that the old strictures in relation to this phase of the type of tour-

ing car in question have lost their potency. The machinery in all its details is open to inspection, and arranged in such a way as to afford ready access in case of the need of road repairs. This phase of the situation is pleasantly unusual, because there was a time in connection with the light car when to get at any of the adjustments was extremely difficult, if not impossible.

The light touring car has taken on the dignity of an individuality all its own; it bears no relation to its old prototype, and is in no sense a runabout, but, broadly speaking, it is a five-passenger touring car of standard characteristics, differing in no wise from the more pretentious touring cars, excepting that it is lighter, has less need of power, hence a smaller motor, and is geared to speed at about two-thirds of the speed of the larger types of touring cars.

Standard Touring Cars

If the new crop of light touring cars may be regarded as roomy five-passenger cars, weighing less than a gross ton in almost every case, and equipped with motors capable of delivering at least a horsepower per 100 pounds, the standard touring car differs in degrees.

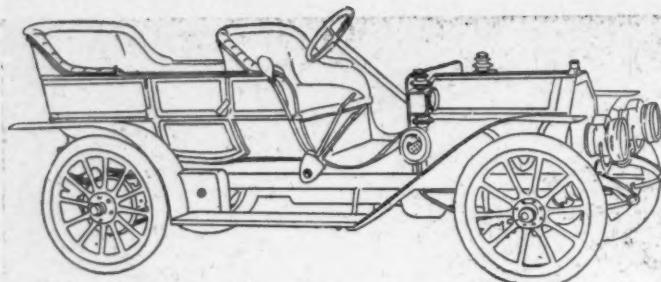
In the standard touring cars seven-passenger bodies of the most roomy description are afforded. The motors are four or six-cylinder types, and the power is on an increased basis, not only because the weights of the cars are greater, but in order to afford a greater ratio of power per hundred weight than the power available in the light touring cars. Obviously, then, the big cars (so-called) go faster, carry seven passengers instead of five, negotiate more difficult roads, because they have more power, wheels of greater diameter, and other parts to match.

In the standard touring cars, the price being considerably higher, there are essential differences which cannot be seen on the surface. Since the motors deliver more power, and since the resistance is greater at every point, the materials must be either initially of greater ability, or the heat treatment to which they may be subjected must be more nearly in accord with the arduousness of the service such cars would necessarily be expected to thrive in.

It is perfectly apparent that to increase the size and the weight of the car, and to increase the motor as respects its horsepower ability in mere direct proportion, would result in a heavier car with a falling off in the speed because the increased weight would sink the tires deeper into the road bed and the road resistance would demand more power for a given speed.

Wheels of Greater Diameter

Prior to the introduction of the drop frame there was an attempt to placate the ideas of patrons who were quick to see the advantages of a low center of gravity. This attempt took shape by way of a reduction in the diameters of the tires used (diameter of the wheels). The cars looked low, but the center of gravity was about the same as it would have been were the



CHARACTERISTIC CHAIN DRIVE STANDARD TOURING CAR

wheels of greater diameter, all other things remaining constant.

In the modern touring cars the drop-frame idea has rendered it feasible to use wheels of suitable diameter without having to use deception with a view to making the center of gravity look lower than it really is. The standard touring cars of the present time, then, are comparatively low in this respect, notwithstanding the fact that they are more commodious than were cars at any previous time.

The Length of the Wheelbase

For the standard touring cars in which the motors are of great power, hence of some length, in which a seven-passenger body takes the place of five, the wheelbase distance is, naturally, considerably more than would obtain with the light touring car. In the standard car, then, the wheelbase distance ranges between 110 and 140 inches. The lower dimension would scarcely accommodate more than a five-passenger space, whereas the higher dimensions given take into account seven passengers.

Systems of Control

If brakes and other means of control are important in cars in general, they are of the utmost importance in touring cars. Touring cars have a wide radius of action, must negotiate country roads of indifferent or even bad construction, and frequently the roads are passed over in the night time under conditions of fog or rain. It is plain to be seen that the brakes must be easy to manipulate and positive in their action. It is equally plain that the new cars more nearly satisfy the exacting demands than they have been satisfied before. The brakes are with larger drums, wider faces, more nearly indestructible linings, and lever systems, laid out to actually accomplish the task imposed upon them.

In the past it was not uncommon to have the speed-changing levers stick on small provocation. This matter has been afforded painstaking care in pretty much all of the line of cars to be seen today, probably because all designers realize the necessity of smooth action in speed-changing levers. It is not now possible to find a car in which two separate speed-changing gears could be meshed simultaneously. Fortunately, there never were many cars so imperfect in point of design as to include this defect. One more point, close enough to this phase of the subject to warrant mention, lies in the care with which designers of the present cars have prevented the accidental meshing of the reverse pinion under a misapprehension that a forward speed was being engaged. True, the reverse pinion would refuse its mate, excepting at coincident speeds, or nearly so. A wrecked transmission gear-set is pretty nearly sure to follow the accidental engagement of the reverse gear when the car is driving ahead at even a fairly low speed. Again, in the old days, to motor in costumes of any value was to depreciate the value of the costumes, if grease, grime, or oil would accomplish such destruction. As it is now, the oiling is done by a suitable force-feed oil pump, remote from the space reserved for the occupants of the cars. Under such conditions it is possible to keep the seats, decks and entrances clean.

Some Potential Factors for Safety

Standard touring cars are essentially capable of speeding; and to speed with safety is a matter of first importance. The modern production requires greater measures for safety because of the greater power of motors used and the increased efficiency

of the transmission, thus ending in a greater maximum speed, with a given weight of car and a given expenditure for gasoline. The effect on the parts of a motor is greater for speed than it is for weight (tires excepted). Since cars are lighter today than they were before, better materials and superior designs are necessary to insure safety. To assure safety, the vitals of the new cars are properly nested behind less essential heavy parts. The steering linkages, for illustration, will be found above and to the rear of the axles, or in equally protected locations. This is in considerable contrast with some of the cars of ancient vintage in which the steering (drag rod) was the lowest down, and the parts which, if they intercepted an obstruction, would result in the greatest damage.

Designers have taken advantage of experience, and while they have evolved cars with a greater ground clearance, they have at the same time lowered the center of gravity. This means that the parts are closely nested and situated at a near approach to the ground clearance line. This is true in almost every case, whereas a year or two ago there were (only) possible exceptions in favor of a high clearance and a low center of gravity.

Features Indicating Increased Comfort

The standard touring cars, besides affording luxurious space, are upholstered in a manner befitting the service to be rendered. The cars are heavy enough to maintain a level platform, in view of the improvements wrought in spring suspensions; with such a balance of the relation of the weight of the bodies to the weight of the passengers that the absence of one or more passengers will not seriously affect the easy riding qualities, once a pronounced disadvantage in automobiles.

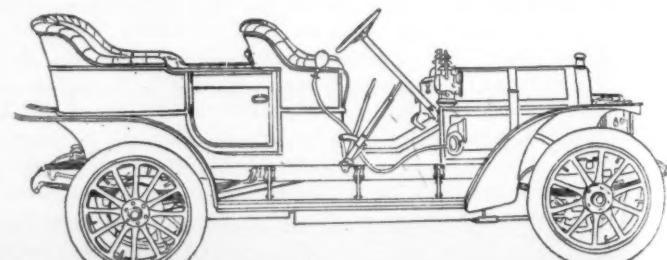
The various noises previously regarded as the most serious drawbacks to cars in touring service are now conspicuous for their absence, not alone as respects the exhaust, but in connection with the linkages and other parts.

Some Special Features

In touring the question of what to do with the chauffeur, were the owner to drive his own car, as most owners would like to do from time to time, has been very definitely settled by what is now known as the close-couple body. This provides a seat over the rear axle for the chauffeur at all times when he is not actually at the wheel. In his comfortable berth to the rear of the body proper he can neither be seen, nor can he hear what the occupants of the car may be talking about.

The close-couple body brings the side entrance so far in front of the rear wheel as to permit the use of a very wide opening. The shaft drive, if considered in this connection, disposes of the sprocket-wheel housing that always did seem to be in the way. Up to very recently the shaft drive was not regarded as sufficiently rugged to withstand the severe usages incidental to touring. This year's cars would seem to indicate that the shaft drive is not limited by any such considerations at all.

There are numerous other examples in which the side-entrance is quite up to the requirements from the best point of view. Looking at the whole question from any angle, it is to observe a very decided display of ingenuity, the purport of which is to afford to the patrons of the industry the conveniences they express a preference for without in any way defeating the ends from the point of view of necessity, allowing that the design demands cannot well be compromised, even to afford comfort.



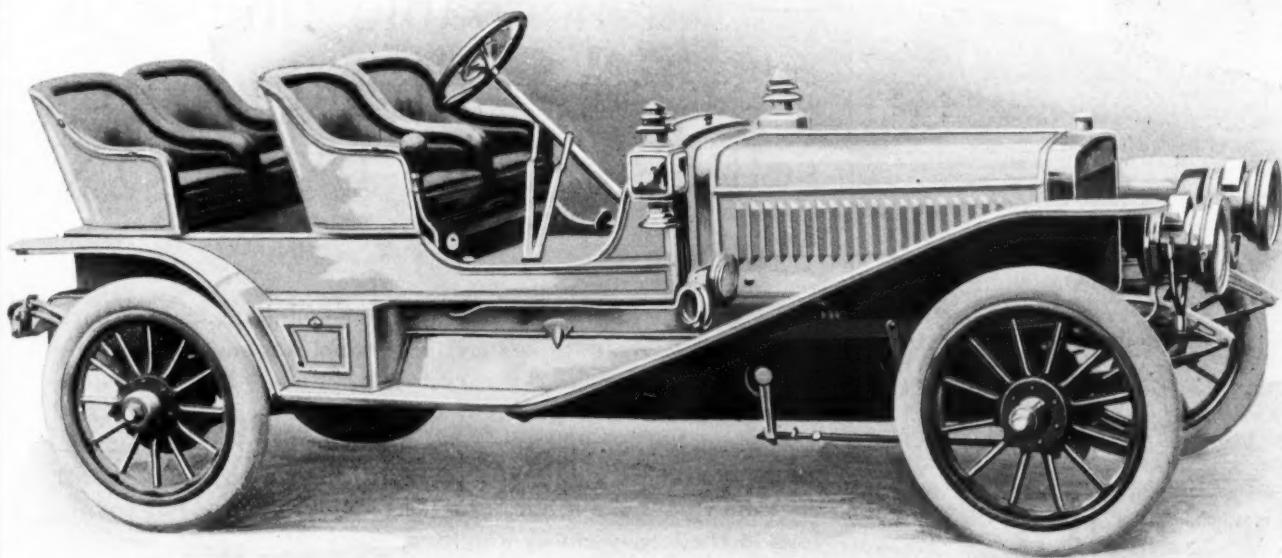
CHARACTERISTIC SHAFT DRIVE LIGHT TOURING CAR

We Make Sixes Exclusively

There are many Sixes on the market. And every one of them but our's (so far as we know) is made by a manufacturer who also makes Fours. These makers just add two cylinders to a Four and call it a Six.

Most of them don't care whether you buy a Four or a Six, because they expect to get you "coming or going." And if you seem to prefer a Four, the chance is that they will **not** tell you what a mistake you are making.

We do not ask you to purchase a



WINTON SIX

because we make Sixes exclusively. Instead we are making Sixes exclusively because Sixes are superior to all other types. And we can prove it to you just as we have done to hundreds of others.

The Winton Six isn't a Four with two added cylinders. It is a Six from the drafting room to the shipping department, from the radiator to the tail lamp. And because it is a real Six (not a makeshift) the Winton Six proves in its work all the points of superiority we claim for it.

The Winton Six starts without cranking.

Runs as sweetly and as quietly as a watch.

Makes hill climbing simple and easy.

Minimizes gear-shifting, eliminates motor vibration, and goes the route like coasting down hill.

This car holds the world's upkeep record of 4343 miles on One Dollar expense. We send the sworn records upon request.

We shall be pleased to send descriptive literature which fully presents the advantages enjoyed by the Winton Six owner. Our book, "Twelve Rules to Help Buyers," applies to all cars and will aid you in making a safe purchase. Write for literature today.

The Winton Motor Carriage Co.

Member of Association Licensed Automobile Manufacturers
912 Berea Rd., CLEVELAND, O., U. S. A.

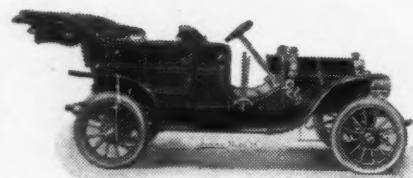
Winton Branch Houses in New York, Boston, Philadelphia, Baltimore, Pittsburg, Detroit, Chicago, Minneapolis, Seattle and San Francisco. Winton agencies in all important places.

See our exhibit at the
Madison Square Garden Show, N. Y., Jan. 16-23

Jackson
AUTOMOBILES
Season
of 1909



Model E \$2000. 4 cyl.



Model H \$1600. 4 cyl.



Model C \$1250. 2 cyl.



Model K \$950. 2 cyl.



Model F \$850. 2 cyl.

Dealers:—

If you want a clean cut, up-to-date, snappy, reliable line of cars—a complete line—a dependable line it is pleasant and profitable to sell—get the JACKSON Agency!

There are especially good features to be found in Jackson cars which give them individuality. Every point is made a substantial point. Every unnecessary frill is cut out. Every possible provision is made for the comfort of those who ride in Jackson cars—notably our Jackson special full elliptic springs, front and rear, made right and tempered right in our own spring plant. Jackson cars are not only practical in every sense, but luxurious in their easy riding qualities.

1909 Models will be exhibited and demonstrated at the Grand Central Palace Show, New York, Dec. 31 to Jan. 7, and at the Coliseum Show, Chicago, Feb. 6 to 13.

No Sand Too Deep—
No Hill Too Steep

JACKSON AUTOMOBILE COMPANY
JACKSON, MICHIGAN



Note clean lines
of design

1909

Great Western 1909

The only line in America of identically the same
construction throughout the various types

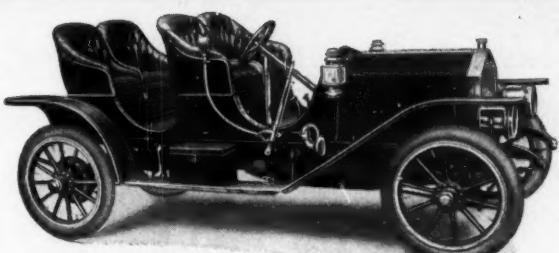


No superfluous
detail

No. 20-A

With both single and
double rumble seat;
gas lamps and high
tension magneto.

\$1600

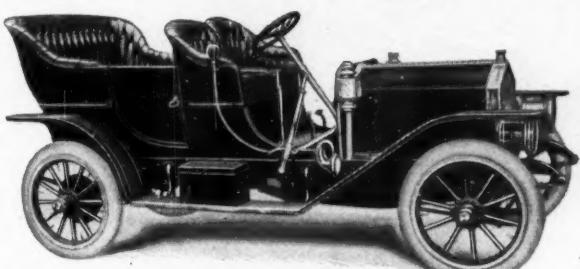


No. 20-A—63 1-3 lbs. per H. P., 30 H. P., 4 cylinder motor, 4" bore, 5" stroke. Weight, with complete equipment, 1,900 lbs.

No. 20

5-passenger with full
equipment. Gas lamps,
generator and high
tension magneto.

\$1600

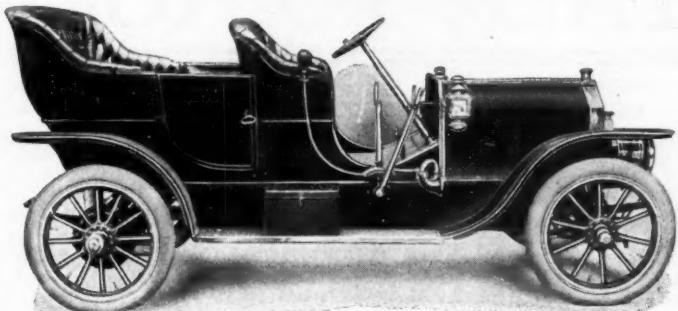


No. 20—66 2-3 lbs. per H. P., 30 H. P., 4 cylinder motor, 4" bore, 5" stroke. Weight, with complete equipment, 2,000 lbs.

No. 21

5-passenger with full
equipment. Lamps, gas
tank, high tension
magneto.

\$2500



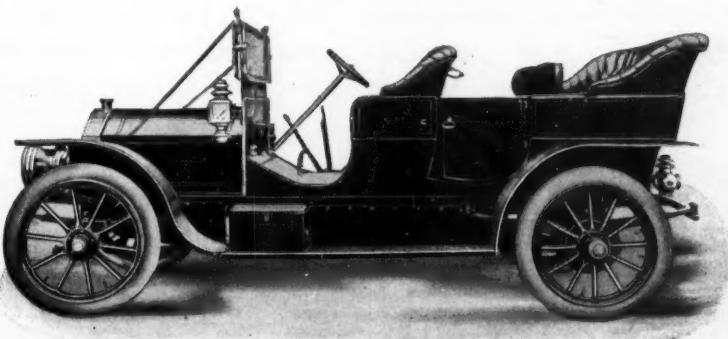
No. 21—62 1-2 lbs. per H. P., 40 H. P., 4 cylinder motor, 4 1-2" bore, 5 1-2" stroke. Weight, with complete equipment, 2,500 lbs.

No. 22

7-passenger with full
equipment.

\$4000

This is the car which
in the past two years
averaged from 9,000 to
12,000 miles with sin-
gle set of tires. Cost
of upkeep never
equaled on any 7-pas-
senger car. 60 lbs.
lighter this year.



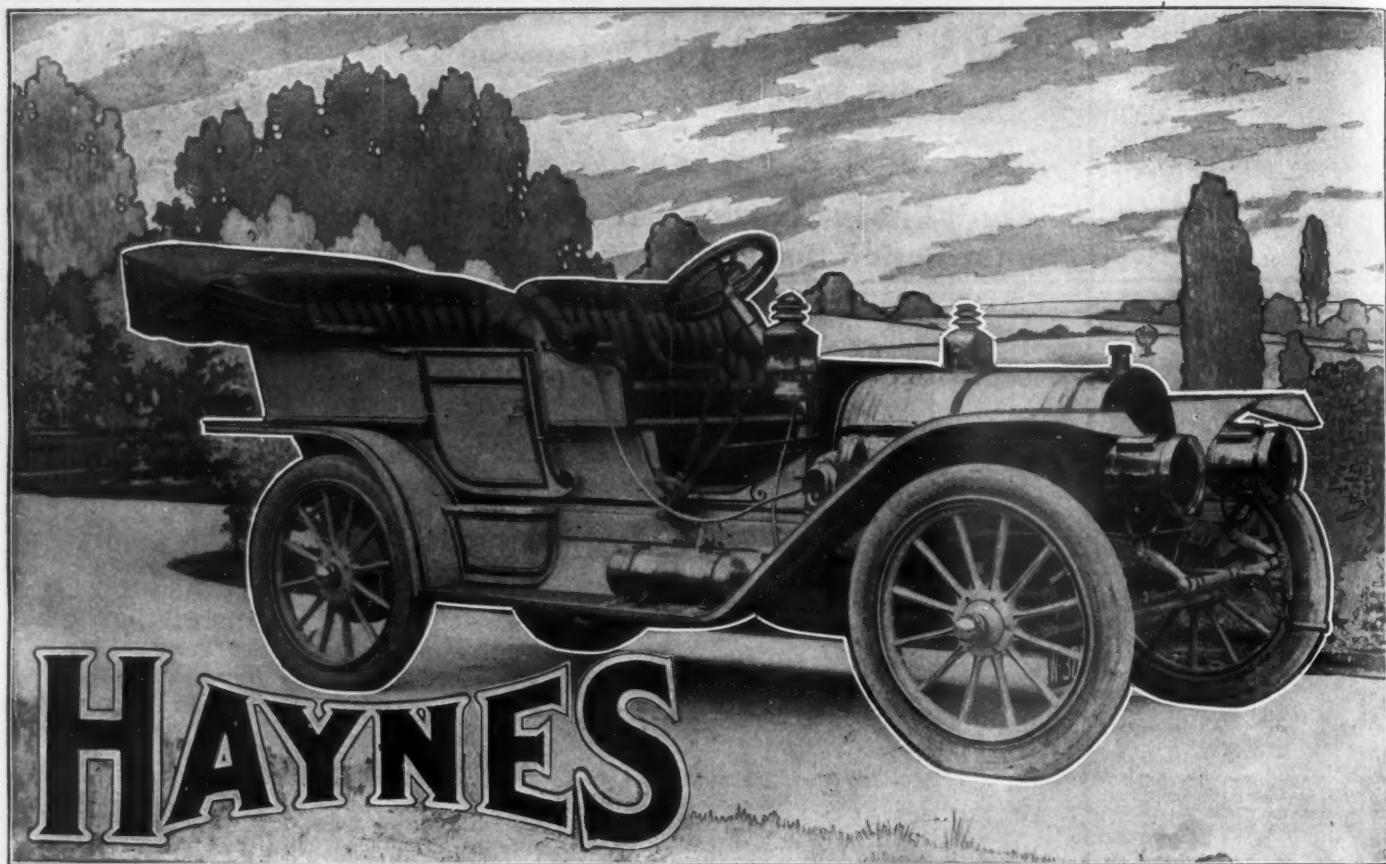
No. 22—58 4-5 lbs. per H. P., 50 H. P., 4 cylinder motor, 5" bore, 6" stroke. Weight, with full equipment, 2,940 lbs.

The past two years the
showing of our 50-H. P.,
7-passenger car has been
so much better that in
at least one of the larger
cities we are leading all
other manufacturers of
this type of car in point
of sales, and that, too,
with little advertising.
With the most powerful
and durable motor for
the weight ever produced
in this country and by
following the same con-
struction throughout the
car it is easy to show ad-
vantages over the heavy
and cumbersome cars of
same capacity and horse-
power. The remarkable
success of this car has
induced us to duplicate
it in two smaller sizes,
and today we have the
only line in which the
lower price cars are of
the same construction,
except as to size. These
smaller cars, No. 20 and
No. 21, can be had with
detachable tonneau,
making an ideal car for
doctors and contractors,
with comfortable space
between front seat and
dash. With such a line
any good live dealer can
go to the front and stay
there if he is trying to
build up a permanent
business.

A visit to our factory
where the adjacent coun-
try affords material for
a thorough test of cars,
will convince you that
we have a line of better
hill climbers and speedier
cars than anything on
the market today.

Distributing Agency:
GREAT WESTERN AUTOMOBILE CO.
1706-8 Main Street, Kansas City, Mo.

Model Automobile Company
25 Harrison Avenue (We will exhibit at the Chicago Show in Station F-2 in Armory)
PERU, INDIANA



The Haynes for 1909. 40 H. P., \$3000

A TALK TO AGENTS

People are wary of the good-looking car that a chauffeur or an expert is unwilling to commend.

Possibly there are some agents who think that the merits of the Haynes universal joints, for instance, are too technical a matter to interest the average business man that comes in to look at the car. Maybe. But next day that man's friend, who knows an automobile when he sees it, steps in. He gets into the chassis instead of into the tonneau.

He also finds the universal joints with the floating cube of solid steel that can't ever break, and the big wearing faces that never wear out.

He finds other things too—a unique and simple roller-pinion-and-sprocket di-

rect drive that solves certain old problems at the rear axle, obviating wear, strains, noise and friction at a place that is a danger point in most cars. He finds a better clutch than any other car ever had. He finds a ratchet gear system that prevents gear stripping. He finds a double flywheel on the motor that makes it run like a six-cylinder without a six-cylinder's cost and complication. And he finds tremendous strength, almost needless strength, everywhere.

And the man that sent him may not hear about those technical points, but he does hear something that makes him phone the agent to reserve that car till cheque arrives in the morning.

Certain Haynes territory is open this year, and we are ready to talk business if you are just the right man.

HAYNES AUTOMOBILE CO., Kokomo, Indiana

Oldest Automobile Manufacturers in America

NEW YORK, 1715 Broadway

42 Highest Awards and Perfect Scores

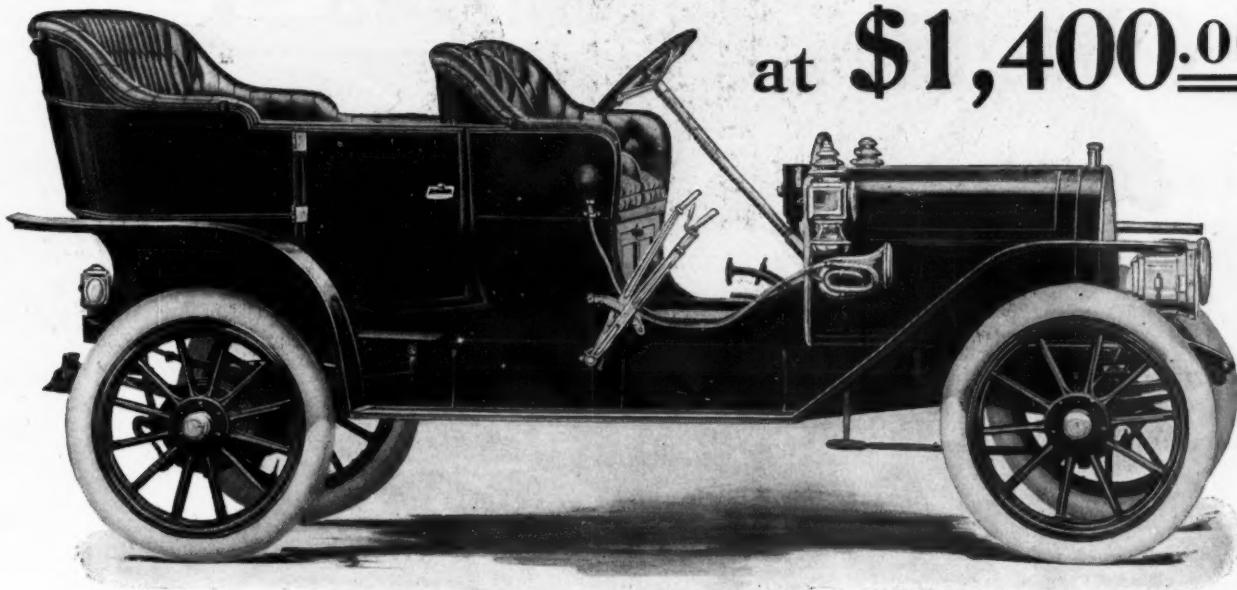
Member A. L. A. M.

CHICAGO, 1702 Michigan Ave.

Some conditions which make possible the
splendid

Cadillac
“Thirty”

at \$1,400.00



Four Cylinder, 30 H. P., Shaft drive, Selective type sliding-gear transmission, 106-inch wheel base

Ninety-five per cent of all the parts which enter into the construction of the Cadillac Thirty are manufactured in the Cadillac plant.

The Cadillac Company maintains its own brass and iron foundries; its own pattern shops; sheet metal shops; machine shops; gear cutting plants; painting, finishing and upholstering departments.

It makes the magnificent motor and it makes even the little bolts, nuts and cap screws which go into that motor and the car. It manufactures its own transmissions, its own radiators, its own hoods and its own fenders.

The Cadillac Company operates its own tool-making department, in which are made all the special jigs, tools and dies used in the manufacture of the Cadillac Thirty.

Every one of the millions of pieces made each year passes through the hands of a corps of trained inspectors whose watchword is—precision and perfection.

The expenditure for tool maintenance alone in the Cadillac plant in a single year is \$60,000.

So accurately is every part finished that thousands of pieces of a kind with thou-

sands of pieces of other kinds are sent to the various assembling departments and there united without so much as the use of the finest file or emery cloth.

There is no occasion for special “fitting.” The limits of measurements in many parts of the Cadillac motor, transmission, etc., are specified to the one-thousandth part of an inch.

More than 500 specially designed automatic labor-saving machines which enable one man to do with greater accuracy the work of four or five, or maybe ten, cut a tremendous figure in reducing cost on an output of ten thousand cars.

Two complete and separate mechanical organizations consisting of 3,200 men are working continually night and day on this same output of ten thousand cars.

It has always been admitted that the Cadillac was the most perfectly standardized car in the world—that its interchangeability of parts was practically absolute.

Now, the plant that achieves perfect standardization likewise produces the most perfect running car, provided, of course, the motor and the other vital parts are competent.

The Cadillac motor bears a reputation

without flaw or tarnish. Twenty thousand Cadillac motors are and have been for four, five and six years operating all over the world, and so far as we know not one has ever gone out of commission.

The Cadillac Thirty motor is direct heir to all the virtues of the 20,000 other Cadillac motors which have gone before—the most perfect motor the Cadillac plant has ever produced.

Bearing in mind the output of 10,000 cars and the continuous force of 3,200 men and 500 automatic labor-saving machines employed in making them, and the perfect standardization produced by manufacturing all the parts, you will begin to understand why the Cadillac Company is able to build a high grade car to sell at \$1,400—a car which in all probability no other plant in the world could build and sell for less than \$2,500.

The next step is to see the car (it will exceed your highest expectations in dignity, proportion and richness), to ride in it at any reasonable speed up to fifty miles per hour; to examine carefully the engine and the mechanism and then to put it into active road competition with any higher priced car you may choose.

If you will do this our car is installed.

In New York, CADILLACS will be exhibited at Madison Square Garden only, Jan. 16-23; and in Chicago at the Coliseum Feb. 6-13.

CADILLAC MOTOR CAR CO.
DETROIT, MICHIGAN.

Member A. L. A. M.

The 1909 Royal Tourist

SPEEDIER, longer, roomier, stronger, easier riding and more readily accessible, the Model "M" is without doubt the most permanent car in every particular that has yet been presented to the motor world



THE MODEL "M"

NEW FEATURES

Motor

Chief of the new improvements is the motor, with a larger bore and stroke, the new dimensions being $5\frac{1}{2}$ inches by 6 inches, giving greatly increased power and a range of from 5 miles to 65 miles on high gear. The enlarged motor demonstrates the acme of excellence to be obtained in smooth running and reliability.

Carburetor

An improved carburetor, actually unique as a fuel saver, insures positive service with the minimum of effort and expense.

Ignition

The improved and independent double ignition system is greatly simplified, does away with much wiring, and is a distinct advance over any system heretofore devised.

Lubrication

Two separate force feed oiling devices of increased capacity and efficiency are incorporated.

Transmission

The selective type of transmission, giving four forward speeds and one reverse, is employed.

Brakes

Five distinct brakes give perfect security to the Royal Tourist user.

Axles

The front axle is of I Beam construction and the rear is of the readily demountable floating type.

Wheel Base and Tonneau

A considerably lengthened wheel base—the new model being 126 inches—an extra roomy tonneau, accommodating six persons, and luxurious appointments throughout, are features of the Model "M" which will commend themselves to the discriminating.

Accessibility

Every innovation, every change and every improvement has been so made as to render it possible to easily remove any part without disarranging any other part.

**Nothing has been omitted and everything has been done
to make the new ROYAL TOURIST the most dependable
car on the American market for years to come**

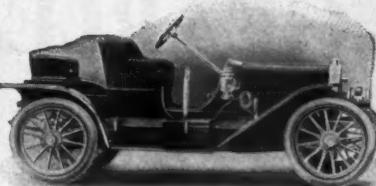
The Royal Tourist Car Company
CLEVELAND, OHIO

The test of service is all we demand

MEMBERS OF A. L. A. M.



Regal



The Automobile Sensation of the Year BUT REMEMBER

There are some low-priced four-cylinder cars on the market.

The Regal is not an experiment. This is its 2d year and it has made good.

"Compare it with a Regal"

\$1250

"Why buy a Freak?"

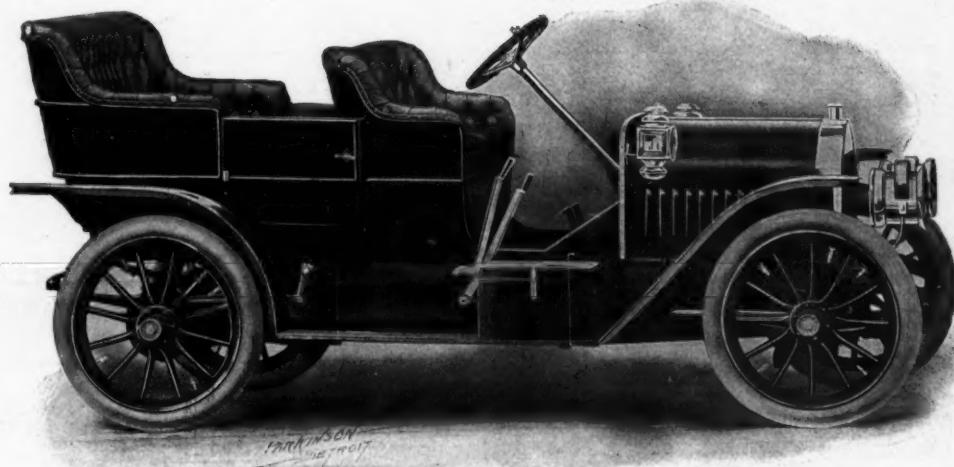
4 Cylinder

30 H. P.

Water
Cooled

High
Tension
Magneto

105 in.
Wheel Base



MODEL "A"
5 Passenger
Touring Car

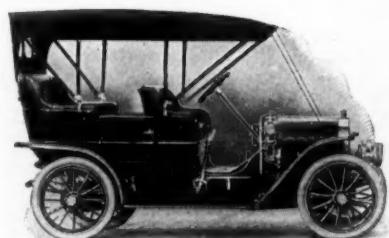
MODEL "B"
3 or 4
Passenger
Runabout

Three speed and reverse selective type sliding gear transmission combined with rear axle. 32-inch wheels, 3½-inch quick detachable tires. 12-spoke wheels, front and rear. The high tension magneto is a standard equipment on all models. Offset crankshaft. Exhaust and inlet valves interchangeable. Cone clutch.

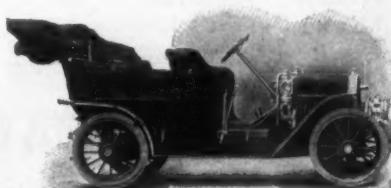
The day of inflated ideas and enormous profits is passed. The automobile industry is settling down to a sane, business-like proposition. No more "Hurrah Boys" business. No more 100 per cent dividends and enormous expenses. The automobile must be produced on a manufacturing basis. Small profits. Large sales. Honest goods. If you want a car with no experiments, no freak ideas, no fads—just an automobile—buy a Regal.

Further specifications are provided in our catalogue, which may be secured from our nearest representative, or will be mailed direct upon request.

SEE OUR EXHIBIT AT THE NEW YORK
SHOW, GRAND CENTRAL PALACE



Regal Motor Car Co.
Baubien Street, Detroit, Mich.



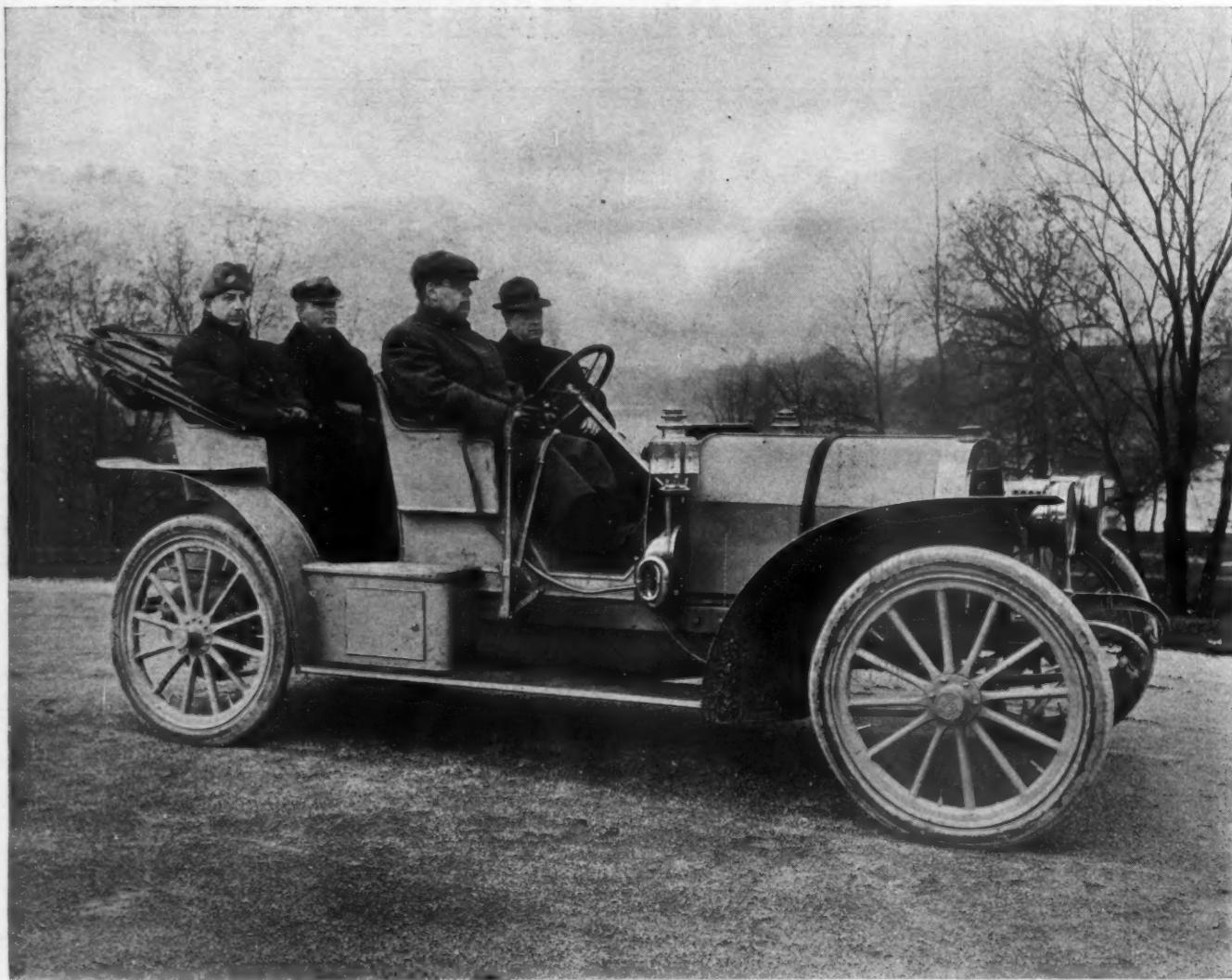
GEARLESS AND OLYMPIC LINE FOR 1909

GEARLESS

Model 30-60 6 cylinder - - - - - \$3,250
Model 50 4 cylinder - - - - - 2,750
 Equipped with Gearless Transmission.
Model 35 4 cylinder - - - - - 1,500
 Friction Drive.

OLYMPIC

Model 30-60 6 cylinder - - - - - \$3,250
Model 50 4 cylinder - - - - - 2,750
 Selective Type Transmission.
Model 35 4 cylinder - - - - - 1,650
 Selective Transmission Axle.



GEARLESS 35

Motor: 4 cylinder $4\frac{1}{2} \times 4\frac{1}{2}$ inches, Renault Type, Water Cooled.
Wheel Base: 119 inches.
Wheels: 36 inches.
Tires: $3\frac{1}{2}$ inches.
Axles: I Beam, front and rear.

35 H. P. Magneto Ignition, - - - - - \$1,500.00

Ignition: Low tension magneto and dry cells.

Transmission: Friction disc operating by spring pressure. Side chain drive.

Body: 4 passenger roadster; 5 passenger touring.

Write for Catalogue.

GEARLESS MOTOR CAR CO.

296 Plymouth Ave.,
ROCHESTER, N. Y.

Premier At the Show

At the show the Premier finds no superior. Mechanical Engineers who know declare that nothing better in correct mechanical design, material or standard workmanship has appeared among the highest priced cars.

Premier On the Road

On the road it has found no equal in reliability, economy of operation and durability. It is not merely in strenuous public tests but in hard private service that this superiority has been proven over and over again.

Premier In the Factory

Only the skilled craftsmen who work with the infinite patience amounting to genius in perfecting every minute detail of Premier construction can fully understand what it requires to obtain such results as are shown by every car that "gets by" the rigid system of inspection and test in the production of

Type "45"—Six Cylinders
\$3,600

Touring, Single or Double
Roadster

The Premier
The Quality Car

Type "30"—Four Cylinders
\$2,500—\$2,600

Touring, Single or Double
Roadster

Premier Motor Mfg. Company
Indianapolis, Indiana

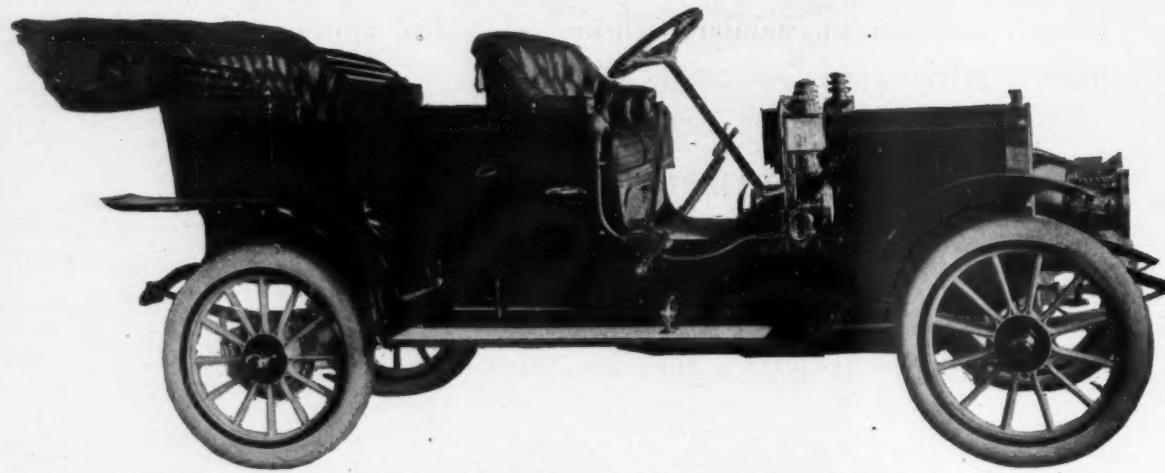
R. M. Owen & Company
East, North and Northwest
Distributors



THE SELDEN CAR

Made by

"THE FATHER OF THEM ALL"



ONE PRICE \$2,000. F. O. B. ROCHESTER

TOURING CAR, ROADSTER, TOY TONNEAU

A genuinely good car cannot be made and sold for less than \$2,000. By this we mean a car like the Selden, containing nothing but the best of materials, workmanship and finish. A car that the manufacturer can stand behind and guarantee for at least a year against any imperfections in workmanship or material.

We buy only the best materials, employ only skilled labor and pay particular attention to details and finish, thereby producing a strictly high-grade car at the lowest possible price.

The up-keep and maintenance of a medium-priced car like the Selden is within the reach of any man of moderate means and the value of the car does not depreciate like that of the lower-priced cars. This is the point to be considered by every purchaser.

The Selden Car is a 4-cylinder 28-30-horsepower (developing 37 horsepower) five-passenger Touring Car or three-passenger Roadster, with 114-inch wheelbase, 34-inch wheels, shaft-drive, selective control, pressed steel frame, metal body, fully equipped.

Superb riding, roomy tonneau, luxurious upholstery, smooth running, great hill-climber, flexible and easily handled, economical in maintenance and up-keep, fine finish, stylish and attractive.

THE COMING CAR OF MODERATE PRICE

Catalog and Agency Proposition upon Request

Agencies Wanted Everywhere

WE WILL EXHIBIT AT MADISON SQUARE GARDEN SHOW

SELDEN MOTOR VEHICLE COMPANY

GEO. B. SELDEN, President

ROCHESTER, NEW YORK

Members Association of Licensed Automobile Manufacturers

THE MARMON

"A Mechanical Masterpiece"



Marmon "Thirty-two", \$2400

An Automobile Classic—A Conspicuous Value

The Marmon "Thirty-two" is neither a cheaply-built car at a low price, nor a "good enough" car at a high price.

It is a high grade car in every sense of the word, built as carefully as a fine watch. The parts are interchangeable, all of them manufactured by us, rigidly tested and carefully assembled into a harmonious whole.

Weighing not over 2,100 pounds, with 32-40 H. P., this "Thirty-two" has a world of speed and ability. In performance, as in appearance, it is a car that needs no apologies—occasions no regrets—a car you will be proud to own.

The "Thirty-two" sustains the Marmon reputation for mechanical excellence. It can be depended upon to stand up under the most severe usage, year after year.

The 1909 Marmon models are being exhibited at the Grand Central Palace Show, New York. They will also be exhibited at the Chicago Show, Feb. 6-13

To the man who looks ahead and buys with his eyes wide open, this car is an emphatic bargain. No other car on the market at \$3,000 or less offers so much actual value.

Get the specifications, notice the character of design and equipment, and make a few careful comparisons.

Genuine Krupp and Chrome Nickel Steels are used for important parts. Bosch magneto and battery—dual system. Three point motor support. Straight line shaft drive. Rear axle and transmission in one unit. Marmon oiling system. Large brakes. Hess-Bright imported ball bearings. Big tires (34x4 all around). Complete equipment. Furnished as Touring Car, Roadster, Suburban, Coupé, or Limousine Town Car.

The Marmon "Fifty," \$3750

A superb car, of most distinguished appearance. In hard, practical cash value it is the superior of the most famous foreign cars selling at two or three times the price. Furnished with seven-passenger body. 50-60 H. P. Completely equipped.

Marmon "Forty-five" Roadster, a special model, \$3,500.

Nordyke & Marmon Co.

Estab. 1851

Indianapolis, Ind.

Standard Mfrs.
A.M.C.M.A.



Built Here

Marmon "Fifty," \$3750

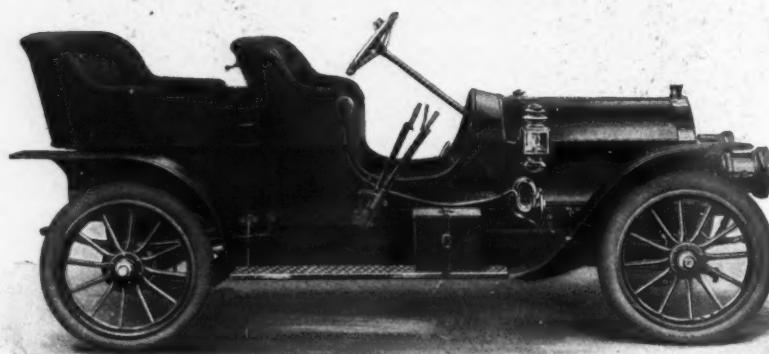
The Easiest Riding Car In The World

THE MOST FOR THE MONEY

1909

THE AUBURN

1909



Model B, \$1400.00

This Announcement is addressed to the man with whom *standing and reputation count*.

Our 1909 Four Cylinder is a high class, light touring car, with all the essentials, simple in design, light in weight, beautiful in appearance, made from the best quality of material, by the best workmanship.

Would you not rather buy an automobile of TRAINED AND EXPERIENCED MEN, who have 8 successful years of manufacturing motor cars behind them, than spend your money for something that is just an experiment?

Get it firmly fixed in your mind that THE AUBURN "30" has proven its worth in actual road service. We invite comparison with cars which command much more money.

SPECIFICATIONS

MOTOR—Four vertical cylinders, cast separately, 4x4, 25-30 H. P.

CLUTCH—Multiple disc.

TRANSMISSION—Selective type, sliding gear, three speeds forward and reverse, direct on high.

DRIVE—Shaft.

BRAKES—Two sets; external and internal, acting on rear hubs.

WHEEL BASE—106 inches.

AXLES—Rear, live type; front, dropped "I" beam section.

IGNITION—Jump spark. Current supply storage battery. Magneto furnished when ordered.

Complete Description in our 1909 Catalog

Auburn Automobile Co., Auburn, Indiana

Chicago Agents, Adams & Engs, 1712 Michigan Ave.

Coast Distributors

Central Motor Car Co., 1156 South Main St.,
Los Angeles, Cal.

Auburn Motor Car Co., 519 Golden Gate Ave.,
San Francisco, Cal.

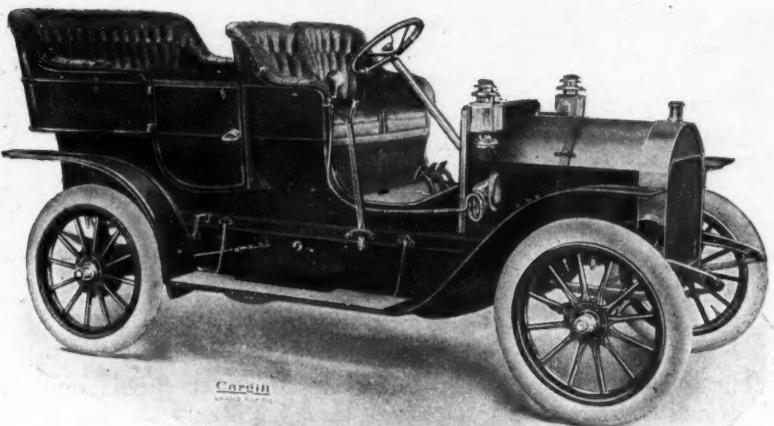
Auburn Motor Car Co., Portland, Ore.

THE MOST FOR THE MONEY

1909

THE AUBURN

1909



Model G, \$1250.00

There is an active demand for a powerful touring car at a moderate price, which will equal in actual road service the highest priced cars. To meet this demand we are continuing Model G, refined and perfected. This car has greater road ability than any car of its class.

Our aim is to build THE BEST; to produce a car which is representative of the highest standard of construction, combined with this, attractiveness and smoothness in operation.

This car runs well and the reason for its success is that each part is perfect. All parts are interchangeable. Get it fixed in your mind that the size of a touring car is no measure of the efficiency of the motor. Efficiency is what counts.

SPECIFICATIONS

MOTOR—5½x5. Double opposed, 24 H. P.

TRANSMISSION—Planetary; two speeds forward and reverse.

WHEEL BASE—100 inches.

TIRES—32x3½ inches.

AXLES—Front ball bearing, rear Hyatt roller bearings.

BODY—Side entrance, five passenger.

Complete Description in Our 1909 Catalog

Auburn Automobile Co., Auburn, Indiana

Chicago Agents, Adams & Engs, 1712 Michigan Avenue

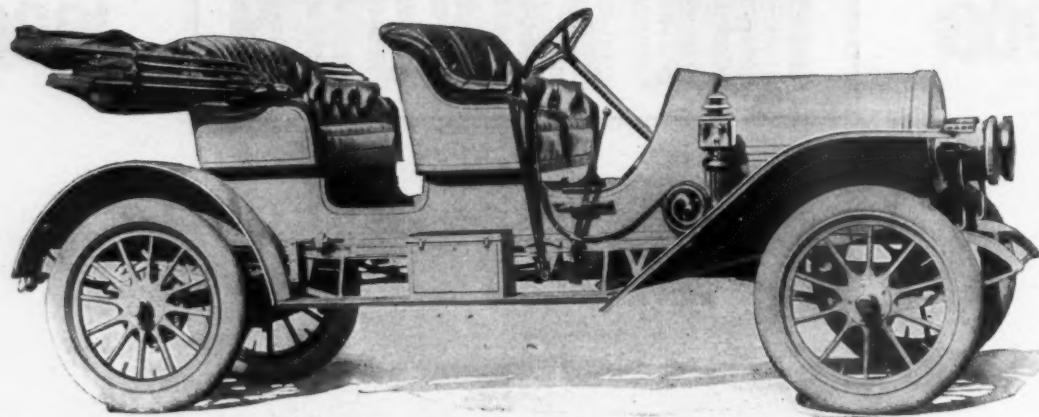
Coast Distributors

Central Motor Car Co., 1156 South Main St.,
Los Angeles, Cal.

Auburn Motor Car Co., 519 Golden Gate Ave.,
San Francisco, Cal.

Auburn Motor Car Co., Portland, Ore.

ADAMS-FARWELL MODEL NINE



Five cylinders, $5\frac{1}{2} \times 5$ inches, 120-inch wheel base, $36 \times 4\frac{1}{2}$ -inch tires \$3,000
Similar chassis of 128-inch wheel base, with seven-passenger body 3,500

That the motoring public is beginning to appreciate the many advantages of our revolving cylinder motor is shown by the fact that we have orders which will keep us busy until June, although our capacity is double what it was a year ago.

The Motor of Model Nine is in no way a departure from our previous designs, although a slight change in the valve action makes it much more noiseless in operation, and we have equipped it with a high tension magneto, which, by the way, has no distributor, being of the single cylinder type, as our timer, spark coil, wiring, etc., have always been. The magneto is removable in two minutes and the timer is arranged so that it is not subject to any wear while the magneto is in use.

We still start the motor from the seat without compressed air or other unreliable means, and adjust the carburetor from the same position. These features, however, are not nearly so important as our perfect system of cooling the motor by its own revolution without any cooling device, or the extreme simplicity of our design, which eliminates all reciprocating parts as well as most of those that cause trouble on other motors.

In speaking of troublesome parts eliminated, we call your attention to our single throw crank shaft with only three bearings; the entire absence of water, fans and other cooling devices; our single pole timer; our secondary distributor, consisting of but a single stationary arm to which our single secondary wire is attached, so that each cylinder picks up its spark at the proper time; our single spark coil with but three poles and no more wiring than is used on single cylinder motors of other makes; our single cam, which operates ten valves and turns upon its bearing at one

sixth of motor speed; our carburetor, which can be cleaned without altering adjustment or taken apart entirely in two minutes; our valves, which are closed by centrifugal force as accurately at high speed as low, without the aid of heavy springs; our oiler with no springs or check valves, less than two feet of oil tubes, and only one moving part, which is driven directly from the timer shaft by means of a worm gear; and the entire absence of cam shafts, gasket joints, piping and muffler.

The simplicity of our design greatly reduces weight and enables us to build for aeronautic use the lightest complete power plant in the world—a five-cylinder, 36 horse power motor, weighing but 97 pounds. A couple of weighty items that we have eliminated but did not mention above are flywheel and crank case. The latter is formed on our motor by two discs, one of which is also inlet manifold, while the other is a flange upon the sleeve transmitting power from the revolving cylinders to the three-speed selective sliding gear set which is housed in the same bronze casting that supports the motor. All cylinders deliver their power over but a single bearing to the transmission, which is located within a few inches of the driving wheels.

There is not one single valid reason for following common practice and revolving the crank shaft instead of revolving the balance of the motor around the shaft, as we do. It is, of course, hard to get out of a rut, but no mechanical engineer who has seen our motor can find a single point in favor of the reciprocating type.

Our catalogue No. A-12 tells all about it. Get posted before the season's output is sold.



THE ADAMS COMPANY

DUBUQUE, IOWA

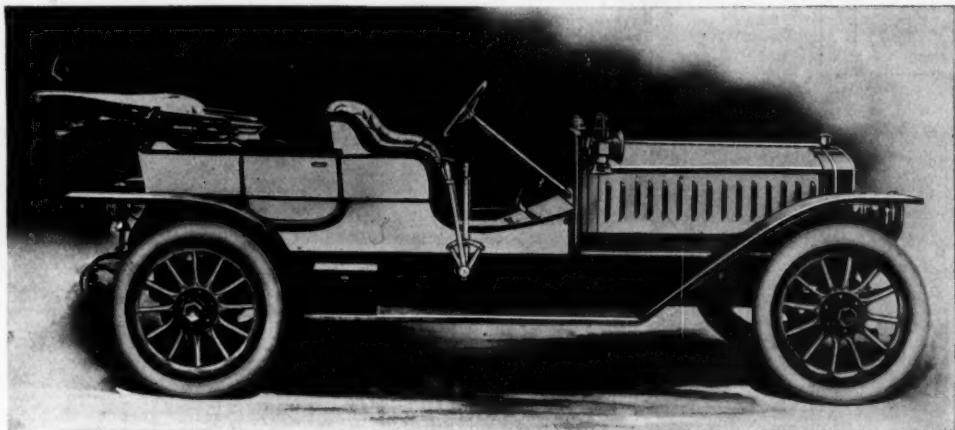


60 H. P.

AUSTIN

90 H. P.

AND OUR NEW MODEL 45

Six Cylinders, $\frac{45}{50}$ H. P., 2250 Pounds, \$3000.00

*Unequaled
Combination*

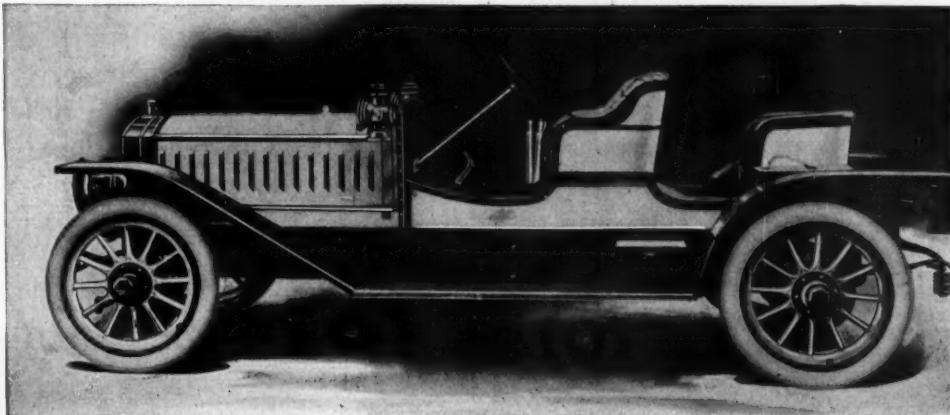
*Highest
Quality
and Power*

*Lowest
Weight
and Price*

The Car That "JUST SUITS" Everybody

A Five-Passenger Touring Car with a Detachable Tonneau that can be replaced by a Rumble Seat in three minutes.

*Same Car
as a
Roadster
MODEL
45R
\$2850.00*



Double Ignition, Selective Transmission, Floating Rear Axle, 36-inch Wheels, 125-inch Wheel Base; and the same highest quality of Material, Workmanship and Finish for which our cars have always been noted.

Write for Catalog and complete description of our 1909 Models. We will exhibit at the Grand Central Palace Show, New York City, December 31st to January 7th.

AUSTIN AUTOMOBILE COMPANY

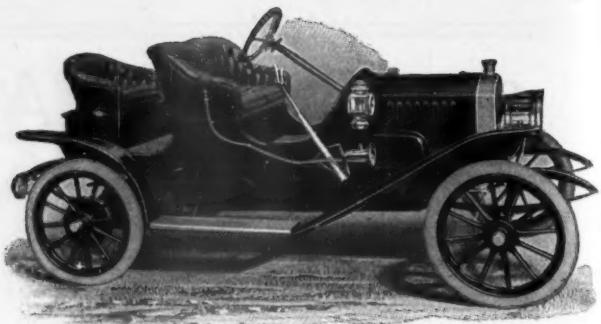
CHICAGO BRANCH: 1420 Michigan Ave.

GRAND RAPIDS, MICH.

Standard Manufacturers A. M. C. M. A.

Model A-1—Will accommodate 3 passengers; rumble seat; 30x3" tires; 20 H.P.; speed, 1-35 miles; single chain drive, enclosed; weight 1,350 lbs.; 2 gas lamps and generator; 2 oil lamps; tail lamp; 40" flexible tube. Horn and full tool equipment.

Model A-3—(\$875.)—Carries the same specifications as Model A1, with the exception that it is equipped with a surrey seat in rear instead of a rumble seat.



MODEL A1.—\$800.00

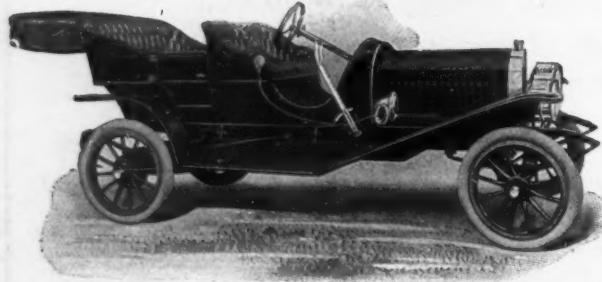
LAMBERT FRICTION DRIVE CARS

THE LAMBERT CAR

SOME one of the six models included in the 1909 line of Lambert Cars should just exactly meet the requirements of every purchaser who wants—

- ¶ Good trustworthy quality without paying an exorbitant price for it,
- ¶ And highest efficiency **under all conditions**, without unnecessary, complicated parts.
- ¶ The **day-in-and-out reliability** of the Lambert friction drive is absolute. It transmits a higher percentage of the power generated than **any** type of gear-transmission car transmits. It is the simplest form of transmission, and the **surest**. It eliminates gear troubles and expense (because there are no gears to strip or wear down). It gives to the Lambert Car a sure-going, smooth-running quality not found in many cars at **any** price.
- ¶ The Lambert is a satisfaction car from motor to tail lamp.

Buckeye Mfg. Co., Anderson, Ind.



LAMBERT "30."—\$1,250.00

Lambert "30"—Capacity, 5 passengers; 25-28 H.P.; 4-cylinder Rutenber motor, with fan attached; speed, 1-45 miles; wheels, 30" wood artillery; wheel base, 110½"; drive, single silent chain enclosed in dust-tight metal case; tires, 30x3½", pneumatic, quick detachable; detachable tonneau; weight, 1,600 lbs.; paint, body deep red, light red stripe on panel, black moulding, running gear light red, striped with English Vermillion, special color on proper notice; equipment, 2 gas lamps and generator; tail lamp; 2 oil side lamps; 30" flexible tube horn and full top equipment. Price, \$1,250, f. o. b. factory.

The \$1,250.00 Model 27 carries the same specifications as the Lambert "30" except that it is equipped with two bucket seats instead of tonneau.



MODEL 19.—\$1,750.00

Model 19.—Carries 5 passengers; 117" wheel base; 32x3½" tires; 4-cylinder Rutenber motor, with adjustable fan attached; 35-40 H.P.; speed, 1-50 miles per hour; single silent chain drive, enclosed; painted Lambert green, striped with light green. Special color on proper notice. Weight, 1,900 lbs.; 2 large gas lamps with generator; 2 oil lamps; horn; tool box on running board; full tool equipment.

LAMBERT FRICTION DRIVE CARS

THE ECONOMICAL CAR

QNE thing, and one thing only, makes possible the manufacture of the Lambert Car at a cost permitting us to sell it at the low price we do.

¶ This one thing is the simple Lambert Friction Drive Transmission.

¶ The cost of producing this most efficient (proven) transmission is so much lower than the cost of **any** type of the complicated gear transmission that we can—and do—put more real automobile worth into every Lambert Car than the manufacturer of **any** gear-transmission car can possibly give for the same money.

¶ For every dollar of the price of a Lambert Car there is a full dollar's worth of power, speed, endurance, comfort, style, and finish—and more, too, if judged by ordinary standards.

¶ The Lambert is the choice of people who "find out" **before** they buy.

BUCKEYE MANUFACTURING CO.

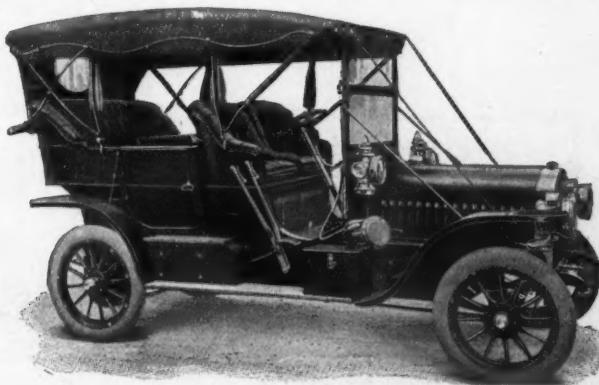
1802 Columbus Ave.

REPRESENTATIVES WANTED
in unoccupied territory

ANDERSON, IND.

Buckeye Mfg. Co., Anderson, Ind.

Model B-2—Carries 7 passengers; wheel base, 106"; 32x4" pneumatic tires; quick detachable; 4-cylinder Rutenber motor, with adjustable fan attached; 35x40 H. P.; speed, 1-45 miles per hour; direct chain drive to each rear wheel; body imperial green, striped with carmine; cape extension top, with full set storm curtains; glass wind shield; 2 large gas lamps with generator; oil lamps; tail lamp; horn foot rail; tool boxes on running board and in rear; full tool equipment.



MODEL B2.—\$2,000.00



Automobile and Service

Make sure that you Pay for Nothing Else but this.
Check over Every Car Offered You, Point by Point.

You can pay \$2,500 for a four-cylinder, 40-horsepower car, if you want to, but it isn't necessary.

You can even go higher, but every dollar you add over the \$1,600 you pay for Oakland four-cylinder Forty is just so much money wasted—you get not one cent extra value in either service or appearance.

Consider the matter from the common-sense standpoint.

There are five items you want to be sure of in the car you own. Here they are:

1. Ample power—that's for speed and hill-climbing.

2. Ease of handling and operation. You want a car that you can enjoy riding in.

3. Low cost of maintenance. What it costs to run a car is just as important as what it costs to buy one.

4. Style and finish—a car that will be a credit to you when you drive in it—a car for you and your best friends.

5. Simplicity of construction—so that you can master and understand every detail.

Now the Oakland cars (this is true of both the "Twenty" and the "Forty") were not built to meet a preconceived price.

We have other details beyond producing the cheapest car on the market.

We designed and built the Oakland car up to a standard that would not admit of the slightest compromise—and then set the price.

The fact that we were able to produce a car that in every respect met the demand of a high-grade family car at a sensationaly low price is just an incident—but a mighty satisfactory one—to the man who wants to get the best car in the country for his money.

So we say again, check over these points before you select your car.

THE OAKLAND "TWENTY".

40 H. P. Touring Car..... \$1,600
40 H. P. Runabout..... 1,600

When you see this big car, and ride in it, it will be hard for you to understand why we do not add at least \$500 to its price.

The Oakland "Forty" has a 112-inch wheel base, weight 2,100 lbs., shaft drive, four-cylinder motor,

cylinders cast in pairs, 4½-inch bore by 5-inch stroke, making a power plant that we could rate higher than 40 h. p. if we were inclined to follow the practice obtaining with many makers. It is sufficient to say that no matter how much you "let her out" you will always find the Oakland "Forty" has just a little more reserve power ready for emergency. 34x4 tires, front and rear. Cooling is by centrifugal pump and vertical tube radiator. Brake external and internal, acting direct on rear wheels. Transmission is of the selective sliding gear type, three speeds forward and reverse. Steel I-beam front axle. Price includes three oil lamps, two large headlights, horn and complete tool kit.

Its flexibility of control, its quiet, steady transmission, and its remarkable roadability make it the one biggest \$1,600 worth of automobile you can buy today.

THE OAKLAND "TWENTY".

20 H. P. Touring or Roadster..... \$1,250
20 H. P. Runabout..... 1,200

A comfortable, roomy, family car equipped with the unique Oakland two-cylinder vertical motor, 4½-inch bore by 5-inch stroke. Don't confuse this with motors of the double opposed type. It is an extremely ingenious counter-balancing device; they run with all the smoothness and absence of vibration formerly thought possible only with a four-cylinder motor.

In fact, anyone taking their first ride in an Oakland "Twenty" finds it hard to believe that it is not a four-cylinder motor under the hood, so noiselessly and smoothly does it run.

The "Twenty" has 100-inch wheel base. Weight 1,700 lbs. Shaft drive, 32x3½ front and rear tires. Thermo-syphon system of cooling with fan in fly-wheel, vertical tube radiator. Brakes external and internal, operating on drums of rear wheels. Transmission of a superior planetary type, two speeds forward and reverse without a single adjustment ever necessary or possible. Price includes three oil lamps, two headlights, horn and complete tool kit.

You must see an Oakland and ride in it to appreciate the perfect result of Oakland design and Oakland skill in construction. Write for the name of our nearest dealer, who will, by actual demonstration, make its superiority clear to you.

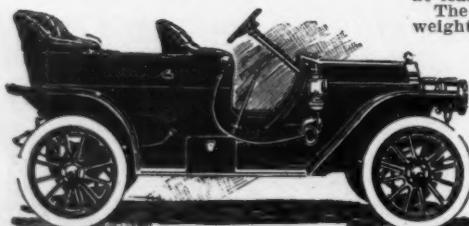
Oakland Motor Car Co.

206 Oakland Ave.,

:-

Pontiac, Michigan

Standard Mfrs. A. M. C. M. A.



The Oakland Twenty—2 cylinder vertical, 20 horsepower, \$1250

We exhibit in New York only at Grand Central Palace Auto Show opening December 31 and at Chicago February 6 to 13.

When Writing to Advertisers, Please Mention Motor Age.

\$1,500 For A Car

Embodying \$11,000,000 Worth of Experience!

There are two kinds of cars:

One is made merely to sell at a low price. The other is made to give service; is mechanically correct; is constructed of the best material, and is sold at a moderate percentage of profit over the cost. That is the Mitchell \$1,500 car.

The manufacturer's experience, his reputation and a large plant can alone guarantee a good car at a low price.

We buy and make on a large scale. We can turn out a car at a figure wholly prohibitive to the small maker.

\$11,000,000 worth of Mitchell cars have been giving complete satisfaction for eight years.

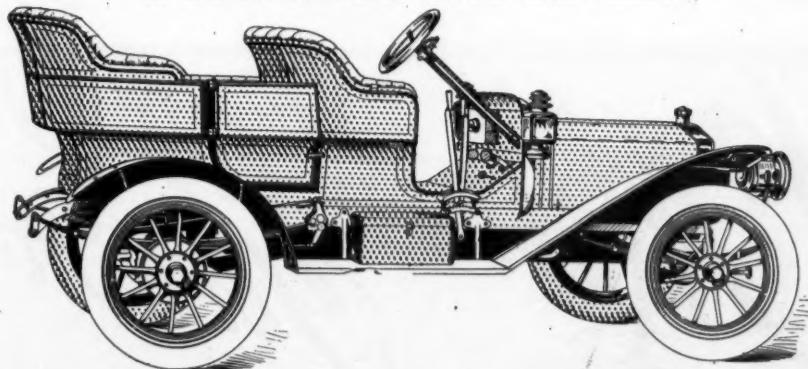
Our plant is now four times as large as it was when we started to make these cars.

Our \$1,500 car is perfect all the way through, down to the smallest details. We wouldn't use more care or better material in its construction if we asked twice as much for it. In it is crystallized all our eight years' experience.

A big, roomy, luxurious 5-passenger touring car, with 4 cylinders, 28-30 horse power engine and capable of doing 50 miles an hour. This is our Model 30 which we offer you for \$1,500.

We even go further than this. We include \$300 worth of actual automobile value which with any other \$1,500 car you would have to buy extra.

See our exhibit Grand Central Palace Show, space 38, main floor.



When Writing to Advertisers, Please Mention Motor Age.

For instance, our price includes a high grade magneto in addition to the regular battery ignition system.

It includes 32-inch wheels and 4-inch tires—all other \$1,500 cars use 3½-inch tires. Our tires cost us \$50 more per set than the 3½-inch tires.

It includes a dozen other features which you would expect to find only in cars selling for \$5,000 or more.

Our transmission is of the best selective, sliding gear type—the kind that is used in all of the well known, high-priced cars.

Our cylinders are cast separately.

We use as much vanadium or nickel steel as the most expensive cars on the market.

We use aluminum castings wherever possible and we strengthen them with bronze.

Our tonneau is detachable, and you have your choice of three styles of body.

Two complete ignition systems—Magneto and the ordinary battery system.

The lubricating system is the best we have found in our eight years' experience.

If we were not equipped to turn out ten cars to the other makers' one, this Mitchell "30" would certainly cost you \$2,000 to \$2,500.

Remember that we do not buy parts from separate makers and simply assemble them. Such cars are experiments—each individual car is an experiment.

But we are able to machine our parts to the accuracy of 1-10000 part of an inch. So our car is in harmony at every point. It is silent and smooth and reliable. Don't take our word for these facts. Examine the car yourself; ride in it, give it the hardest try-out you know. Then, if it doesn't "make good," don't buy it.

Full particulars upon request.

Mitchell Motor Car Co., 550 Mitchell St.
RACINE, WIS.
Standard Manufacturers, A. M. C. M. A.

You may send me a detailed description of your new \$1,500 Mitchell 30.

Name _____

Address _____

Pullman

1909

ANNOUNCEMENT

WE are ready for 1909 business. As hitherto in years past, the "PULLMAN" cars will maintain leadership as positively the very best automobile value obtainable. If it is possible to attain perfection, we have reached that state in the 1909 "PULLMAN" cars.

Viewed from any standpoint—as a prospective purchaser or a dealer in motor cars—you can't match the "PULLMAN" quality, the "PULLMAN" prices or the wonderful "PULLMAN" efficiency, design, simplicity of construction, ease of operation, economy of up-keep, durability; in fact, "PULLMANS" are in every feature incomparably superior to any cars yet designed.



Model "K" 30 H. P. Touring Car. 4½ inch bore, 4½ inch stroke.
Price, \$2000.00, including Bosch Magneto.

Every step from the raw material to the finished car in the progress of the making of a "PULLMAN" Automobile is under the eye of an expert in OUR OWN FACTORY, and we stand back of the quality, which is the highest standard that can be produced.

In your own interest, don't buy a car, don't accept an agency,
until you have full particulars about 1909 "PULLMAN" CARS.

A Model to meet every requirement at the right price. WRITE TODAY.

York Motor Car Co.
York, Pa.

14 Entries. Only One Perfect Score--The Franklin

Against thirteen competitors, the 1909 Model D Franklin touring car won the only perfect score in the Worcester, Mass., reliability contest, December 12. Eight of the contestants went through the road run without penalization. But the Franklin was the only one to withstand the rigid examination after the run by a technical committee from the faculty of the Worcester Polytechnic Institute.

All except the Franklin suffered penalization due to broken, strained, bent or loosened parts, leaks, etc.

It was necessary for the committee to go over the Franklin six times in order to satisfy the other competitors.

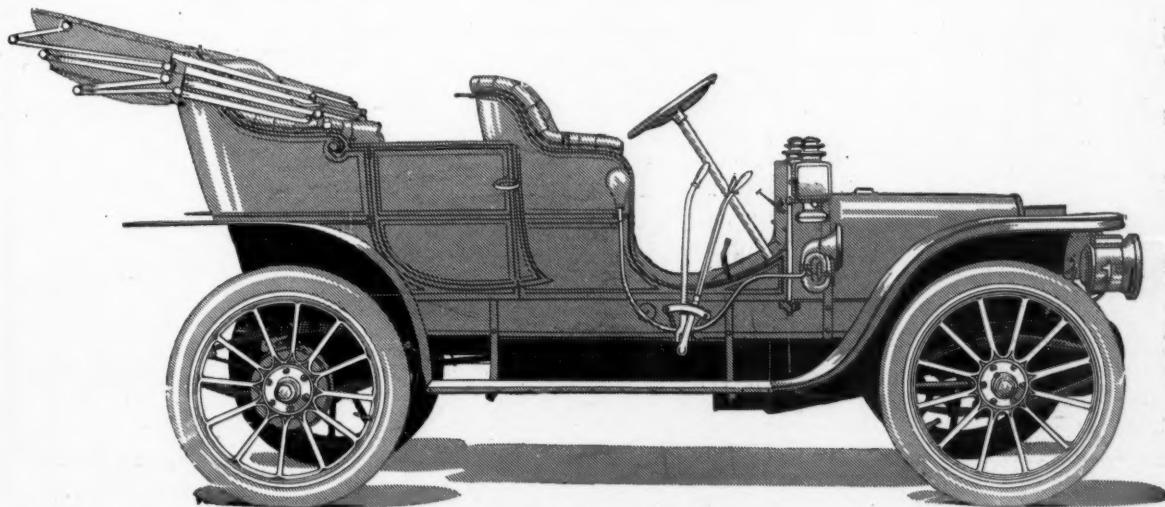
Was this luck? No!

This is the fifth severe contest in which a 1909 Franklin stock model has carried off the honors. Franklins won perfect scores in the Glidden tour. The only Franklin entered in the Breton Woods endurance run won a perfect score. Another Franklin won a perfect score in the 1,000-mile Chicago reliability contest and also had the lowest gasoline consumption in its class. Still another Franklin won a perfect score in the Cleveland sealed bonnet run and had the lowest gasoline consumption of all contestants.

These five consecutive perfect scores in five consecutive contests, each with a stock model and—except in the Glidden Tour—only one in each contest, are most significant. How significant is of interest to every buyer of an automobile. No other automobile has such a record.

Most any automobile can make a hard road run without stops, but to go through without troubles of any kind and without any derangement or strains resulting is what tells the story.

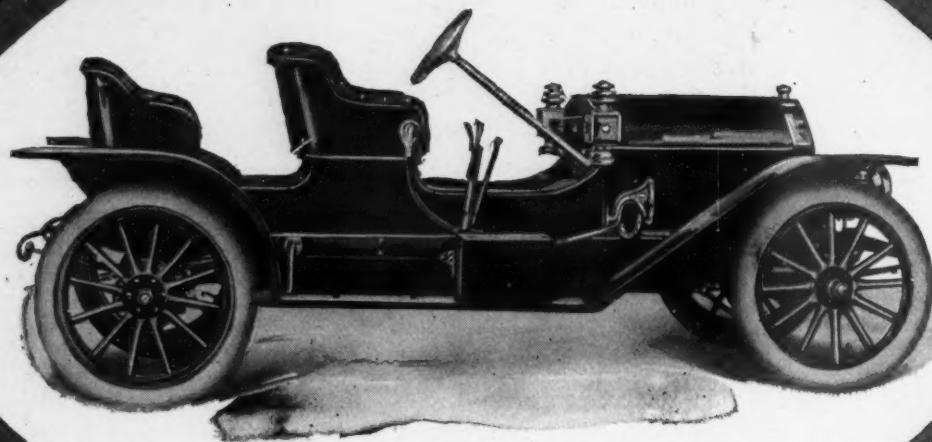
The light-weight air-cooled Franklin does not strain nor rack itself. It stands up. It rides comfortably.



Model D. \$2800.

A high-grade powerful automobile. Refined, reliable and safe. Abler for touring on American roads than any automobile but a Franklin. Beautiful to look at, comfortable to ride in and doing its work at the lowest operating cost.

H. H. FRANKLIN MFG. CO., Syracuse, N. Y.



Inter-State Single Rumble Roadster, \$1,750.

The Inter-State

THE INTER-STATE is in the highest class of 1909 automobiles. It is a perfectly made, light-running, speedy, graceful, enduring car.

Sold at a price—\$1,750 complete, *including Eisemann Magneto*—but little higher than the price asked for “good-enough-until-later” cars.

Of this latter type there are many. Of the Inter-State type there is but *one* at anywhere near the price. And *it* is the Inter-State.

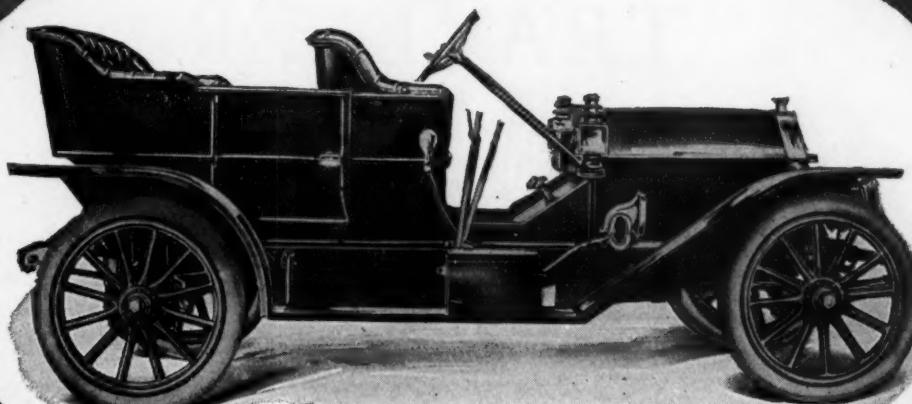
Where is the economy or the automobile satisfaction in buying a car that you will probably discard next year for a *real* car? Would it not be actual economy and also “good business” to buy the *real* car, the satisfying car, the lasting car, this year; especially since you can buy this kind of a car for just a little more money than is asked for the temporary car?

If you want an automobile and do not feel like paying anywhere from twenty-five hundred to five thousand dollars—

Here is a car—the Inter-State—that will suit your price requirements and give you the quality you really want.

In style, comfort, speed, control, and low cost of up-keep, the Inter-State finds its only competition in the *high-priced*, high grade cars.

We want you to see the Inter-State. We want you to drive it, and give it every



Inter-State Standard Touring Car, \$1,750.

test before you *think* of spending your money for a cheaper car—or even a higher-priced car. We will be content to accept your judgment as to the value of the Inter-State at \$1,750.

AT THE SHOWS—The full line of Inter-State automobiles, including Standard Touring Car, Demi-Tonneau, Double Rumble Roadster, Single Rumble Roadster and Tourabout, will be exhibited at Grand Central Palace, New York, Dec. 31 to Jan. 7, and at the Coliseum, Chicago, Feb. 6-13.

Dealers and agents will quickly appreciate the opportunities opened to them by the Inter-State. Our proposition is unusually attractive.

INTER-STATE AUTOMOBILE CO.

125 Willard Street, MUNCIE, IND.

SPECIFICATIONS

FRAME—Pressed from cold rolled steel, special stock.

FRONT AXLE—“I” beam, drop forged in one piece—not welded—and double heat treated.

REAR AXLE—The reliable semi-floating type with large axle shafts and Hyatt Roller Bearings.

WHEELS—Artillery type, 12 spokes, 1½ in., 34 in. diameter.

TIRES—Standard Goodyear Quick Detachable, Continental or Diamond, 34x4 inches.

BRAKES—Four 12-in. brakes, all acting on rear hubs, external and internal.

TRANSMISSION—Three speed selective type and reverse, with vanadium steel gears. The selective mechanism built inside transmission case, thoroughly lubricated at all times.

GEAR RATIO—3½ to 1, giving from 5 to 60 miles on high gear.

HORSEPOWER—35 to 40.

MOTOR—Four-cylinder, 4½x5, water cooled, cylinders cast in pairs.

CRANK SHAFT—Special drop forging 35 to 40 carbon steel, double heat treated.

IGNITION—Double System Eisemann Magneto, commutator, battery and quadruple coil.

BODY STYLES—Touring Car, Double Rumble Roadster, Single Rumble Roadster, Tourabout and Demi-Tonneau.

WHEEL BASE—112 inches.

TREAD—56½ inches.

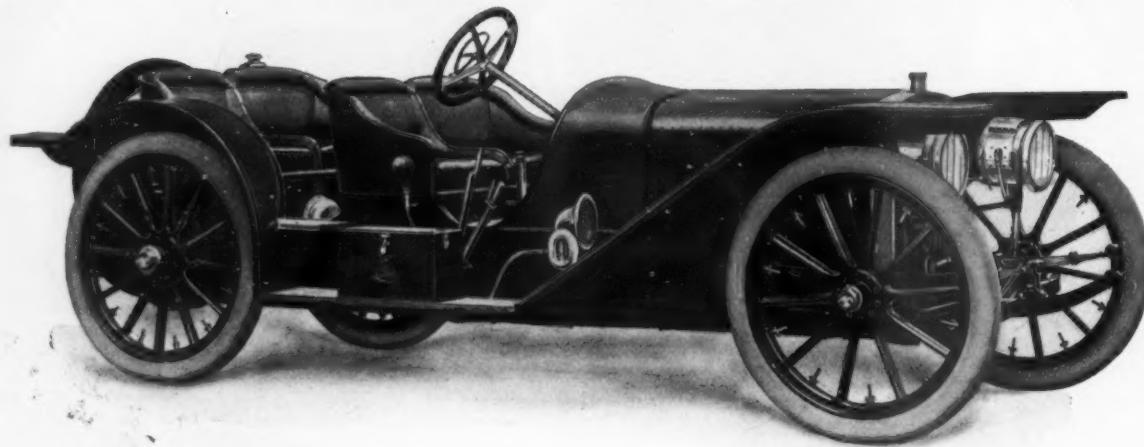
COLOR—Standard Inter-State red.

PRICE—With best of equipments, headlights and generator, side oil lamps, tall lamp, tube horn, tire repair kit and tools—Eisemann Magneto—f. o. b. Muncie, \$1,750.

THE AMERICAN

40-INCH WHEEL

TRAVELER



UNDERSLUNG FRAME CHASSIS. FOUR CYLINDER, 50-60 H. P. MOTOR. PRICE, \$4,000

THIS CAR WILL BE THE SENSATION OF THE SHOW

From this time forward you will hear more and more and more of the American.

Heretofore American owners have been mostly men who had formerly driven fine imported cars.

For two years the discriminating few have understood its unique position in the motor market. But the crowd has followed the plants of huge output and conventional construction.

Only two hundred American cars will go out into the several states this season, but each will be driven by a motor connoisseur who cares little about first cost if power, service and value be there.

In your clubs, and wherever men meet to discuss the merits of motoring, you will hear its name with increasing frequency, displacing, as like as not, some other name that has hitherto been more familiar.

The philosophy of this you will better understand if you will study the smart make-up of the car; learn something of the unique underslung construction of the American Traveler and write for a descriptive account of its mechanical anatomy and performances.

SPECIFICATIONS OF THE AMERICAN TRAVELER:

MOTOR—Four cylinders cast in pairs; 5 $\frac{1}{2}$ x 5 $\frac{1}{2}$ in. 50-60 H. P. Water cooled; centrifugal circulating pump.

IGNITION—Bosch high tension magneto; auxiliary coil and battery.

CARBURETOR—Float feed, auxiliary air supply type.

LUBRICATION—Four-sight-feed lubricator for cylinders and mechanism. Splash oiling crank case. Transmission and differential run in oil.

CLUTCH—Leather-faced, fan-bladed cone interlocked with emergency brake.

DRIVE—Direct shaft to differential and floating live rear axle that bears no weight.

WHEELS—40x4 in. front, 40x4 in. rear.

WHEELBASE—122 inches. Tread, 56 inches.

EQUIPMENT—Two gas headlights; one tail lamp; trunk rack; acetylene generator; French horn; tool kit.

American Motor Car Co.

INDIANAPOLIS, IND.

Standard Manufacturers A. M. C. M. A.

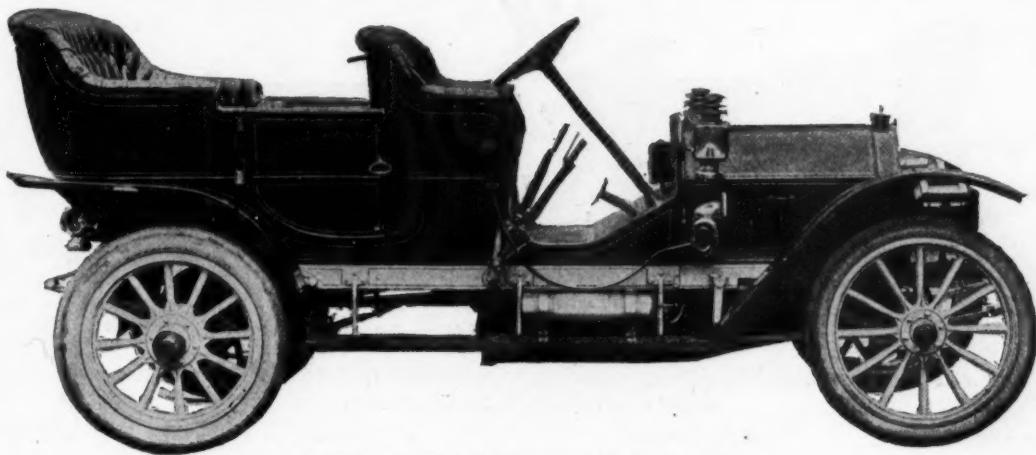


SEE THE AMERICAN AT THE GRAND CENTRAL
PALACE SHOW THIS WEEK



MOON THIRTY-TWO

MOON-1909-MOON



Model C, Five-passenger Touring Car

MOON THIRTY-TWO

Refinement

THE day of the slogan, "The car to get there and come back," is past. In 1909 the car that will not run "there and back" is not a **real automobile**. Something different is demanded by the responsible dealer and the thoughtful buyer—it is **refinement**.

Refinement that stands for increased strength and efficiency, more simplicity and greater economy in the long run, is found in the 1909--Moon Thirty-Two.

Moon Motor Car Company

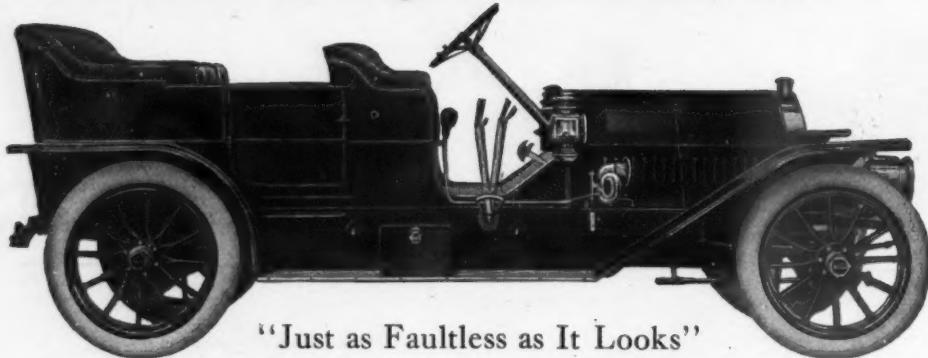
JOSEPH W. MOON, President

4402 Main Street

ST. LOUIS, U. S. A.

MOON-1909-MOON

The 1909 National



"Just as Faultless as It Looks"

These specifications should appeal to experienced motorists who appreciate a car of irreproachable character.

MODEL 9-35.

Motor—Four cylinder, $4\frac{1}{4} \times 1\frac{1}{2}$ inches vertical, cast in pairs, mounted on main frame. Mechanical valves, exhaust and admission on opposite sides and interchangeable. A ball-bearing crank shaft and ball-bearing cam shafts. Tapered nipples used on intake, exhaust and water pipes in place of packing. Extra long Parsons white bronze bearings on connecting rods. Gear driven distributor. Divided aluminum crank case. Interchangeable parts.

Clutch—Self-contained, aluminum cone, leather faced, spring cushioned.

Transmission—Sliding gear selective type. Ball-bearing.

Wheel Base—115 inches.

Drive—Bevel gear through ball-bearing propeller shaft and flexible joint to rear axle of improved design.

Bearings—Annular type ball-bearings throughout.

Wheels—Wood, artillery pattern, ten $1\frac{1}{2}$ -inch spokes front and twelve rear.

Oiling—Crank case, constant level force feed oiler, oiling all working parts of motor.

Ignition—Two separate, complete systems. One a gear-driven high-tension Bosch magneto. The other a storage battery, single coil and distributor. Each system has a separate set of spark plugs.

Gasoline Capacity—15 gallons. Tires—34x4. Diamond, G. & J. or Michelin.

Brakes—Two systems. Two internal expanding metal to metal hub brakes and two band brakes on outside of rear wheel drums.

Frame—Pressed steel $4\frac{1}{2}$ -inch channel section firmly riveted and braced and curved up over rear axle. No sub-frame.

Front Axle—I-beam, steel forging.

Rear Axle—Compound construction. Inner axle used only as a driver. Wheels turn upon double annular type ball-bearings on hollow axle which carries all weight.

Finish—Coach carmine or national red; black stripes.

Body—Straight line sheet metal, side entrances. Divided front seats. Five passengers.

Steering System—Eighteen-inch hand wheel, inclined post. Worm and gear, non-reversible chuck. Ball joint connections to steering knuckle.

Control—Single lever at driver's right controls all speeds. Three forward and one reverse.

Spring—Half-elliptic; 40-inch front, under frame; 48-inch rear, outside of frame; 37-inch cross on rear.

Equipment—Two 9-inch Rushmore searchlights with generator; side and tail lamps. Storm aprons, horn and tools.

Price—\$2,750, f. o. b. Indianapolis.

MODEL 9-40.

Motor—Four cylinder, 5×5 inches vertical, individually mounted on sub-frame. Mechanical valves, exhaust and admission on opposite sides and interchangeable. Ball-bearing crank shaft and ball-bearing cam shafts. Tapered nipples used on intake, exhaust and water pipes in place of packing. Extra long Parsons white bronze bearings on connecting rods. Gear-driven distributor. Divided aluminum crank case. Interchangeable parts.

Clutch—Self-contained, aluminum cone, leather faced, spring cushioned.

Transmission—Sliding gear selective type. Ball-bearing.

Wheel Base—125 inches.

Drive—Same as Model 9-35.

Bearings—Annular type D. W. F. ball-bearings throughout.

Wheels—Wood, artillery pattern, twelve $1\frac{1}{2}$ -inch spokes front and rear.

Oiling—Same as in Model 9-35.

Ignition—Two separate, complete systems. One a gear-driven high-tension Bosch magneto. The other a storage battery, single coil and distributor. Each system has a separate set of spark plugs.

Gasoline Capacity—17 gallons. Tires—36x4 $\frac{1}{2}$. Diamond, G. & J. or Michelin.

Brakes—Same as in Model 9-35.

Frame—Pressed steel $4\frac{1}{2}$ -inch channel section with sub-frame firmly riveted and braced and curved up over rear axle.

Front Axle—Seamless, cold-drawn steel tubing, heavy gauge, forged yokes, or I-beam steel forging.

Rear Axle—Same as in Model 9-35.

Finish—Coach carmine or national red; black stripes.

Body—Curved line cast or straight line sheet aluminum, side entrances. Divided front seats. Carrying capacity, seven passengers. (Two on folding seats in tonneau.)

Steering System—Same as in Model 9-35.

Control—Single lever at driver's right controls all speeds. Three forward and one reverse.

Spring—Half-elliptic; 40-inch front, under frame; 50-inch rear, outside of frame; 39-inch cross on rear.

Equipment—Two 9-inch Rushmore searchlights with generator; side and tail lamps. Storm aprons, horn and tools.

Price—\$3,700, f. o. b. Indianapolis.

MODEL 9-50.

Motor—Six cylinder, $4\frac{1}{4} \times 1\frac{1}{2}$ inches vertical, in pairs, mounted on sub-frame. Mechanical valves, exhaust and admission on opposite sides and interchangeable. Ball-bearing crank shaft and ball-bearing cam shafts. Tapered nipples used on intake, exhaust and water pipes in place of packing. Extra long Parsons white bronze bearings on connecting rods. Gear-driven distributor. Divided aluminum crank case. Interchangeable parts.

Clutch—Self-contained, aluminum cone, leather faced, spring cushioned.

Transmission—Sliding gear selective type. Ball-bearing.

Wheel Base—130 inches.

Drive—Same as Model 9-35.

Bearings—Annular type D. W. F. ball-bearings throughout.

Wheels—Wood, artillery pattern, twelve $1\frac{1}{2}$ -inch spokes front and rear.

Oiling—Same as in Model 9-35.

Ignition—Two separate, complete systems. One a gear-driven high-tension Bosch magneto. The other a storage battery, single coil and distributor. Each system has a separate set of spark plugs.

Gasoline Capacity—17 gallons. Tires—36x4 $\frac{1}{2}$. Diamond, G. & J. or Michelin.

Brakes—Same as in Model 9-35.

Frame—Pressed steel $4\frac{1}{2}$ -inch channel section with sub-frame firmly riveted and braced and curved up over rear axle.

Front Axle—Seamless, cold-drawn steel tubing, heavy gauge, forged yokes, or I-beam steel forging.

Rear Axle—Same as in Model 9-35.

Finish—Coach carmine or national red; black stripes.

Body—Curved line cast aluminum, side entrances, removable tonneau, platform type. Divided front seats. Carrying capacity, seven passengers. (Two on folding seats in tonneau.)

Steering System—Same as in Model 9-35.

Control—Single lever at driver's right controls all speeds. Three forward and one reverse.

Spring—Half-elliptic; 44-inch front, under frame; 56-inch rear, outside of frame; 39-inch cross on rear.

Equipment—Two 9-inch Rushmore searchlights with generator; side and tail lamps. Storm aprons, horn and tools.

Price—\$4,200, f. o. b. Indianapolis.

MODEL 9-60.

Motor—Six cylinder, 5×5 inches vertical, individually mounted on sub-frame. Mechanical valves, exhaust and admission on opposite sides and interchangeable. Ball-bearing crank shaft and ball-bearing cam shafts. Tapered nipples used on intake, exhaust and water pipes in place of packing. Extra long Parsons white bronze bearings on connecting rods. Gear-driven distributor. Divided aluminum crank case. Interchangeable parts.

Clutch—Self-contained, aluminum cone, leather faced, spring cushioned.

Transmission—Sliding gear selective type. Ball-bearing.

Wheel Base—137 inches.

Drive—Same as Model 9-35.

Bearings—Annular type D. W. F. ball-bearings throughout.

Wheels—Wood, artillery pattern, twelve $1\frac{1}{2}$ -inch spokes front and rear.

Oiling—Same as in Model 9-35.

Ignition—Two separate, complete systems. One a gear-driven high-tension Bosch magneto. The other a storage battery, single coil and distributor. Each system has a separate set of spark plugs.

Gasoline Capacity—20 gallons. Tires—36x5. Diamond, G. & J. or Michelin.

Brakes—Same as in Model 9-35.

Frame—Pressed steel, 5-inch channel sections, with sub-frame firmly riveted and braced and curved up over rear axle.

Front Axle—Seamless, cold-drawn steel tubing, extra heavy gauge, forged yokes, or I-beam steel forging.

Rear Axle—Same as in Model 9-35.

Finish—Coach carmine or national red; black stripes.

Body—Curved line cast aluminum, side entrances, removable tonneau, platform type. Divided front seats. Carrying capacity, seven passengers. (Five carried in tonneau.)

Steering System—Same as in Model 9-35.

Control—Single lever at driver's right controls all speeds. Three forward and one reverse.

Spring—Half-elliptic; 44-inch front, under frame; 56-inch rear, outside of frame; 39-inch cross on rear.

Equipment—Two 9-inch Rushmore searchlights with generator; side and tail lamps. Storm aprons, horn and tools.

Price—\$5,000, f. o. b. Indianapolis.

National Motor Vehicle Co., 1006 East 22d Street and Monon Railroad Indianapolis, Indiana.

The Marion Flyer

"The Car With Class"

1 H. P. to every 52 lbs. of Actual Weight

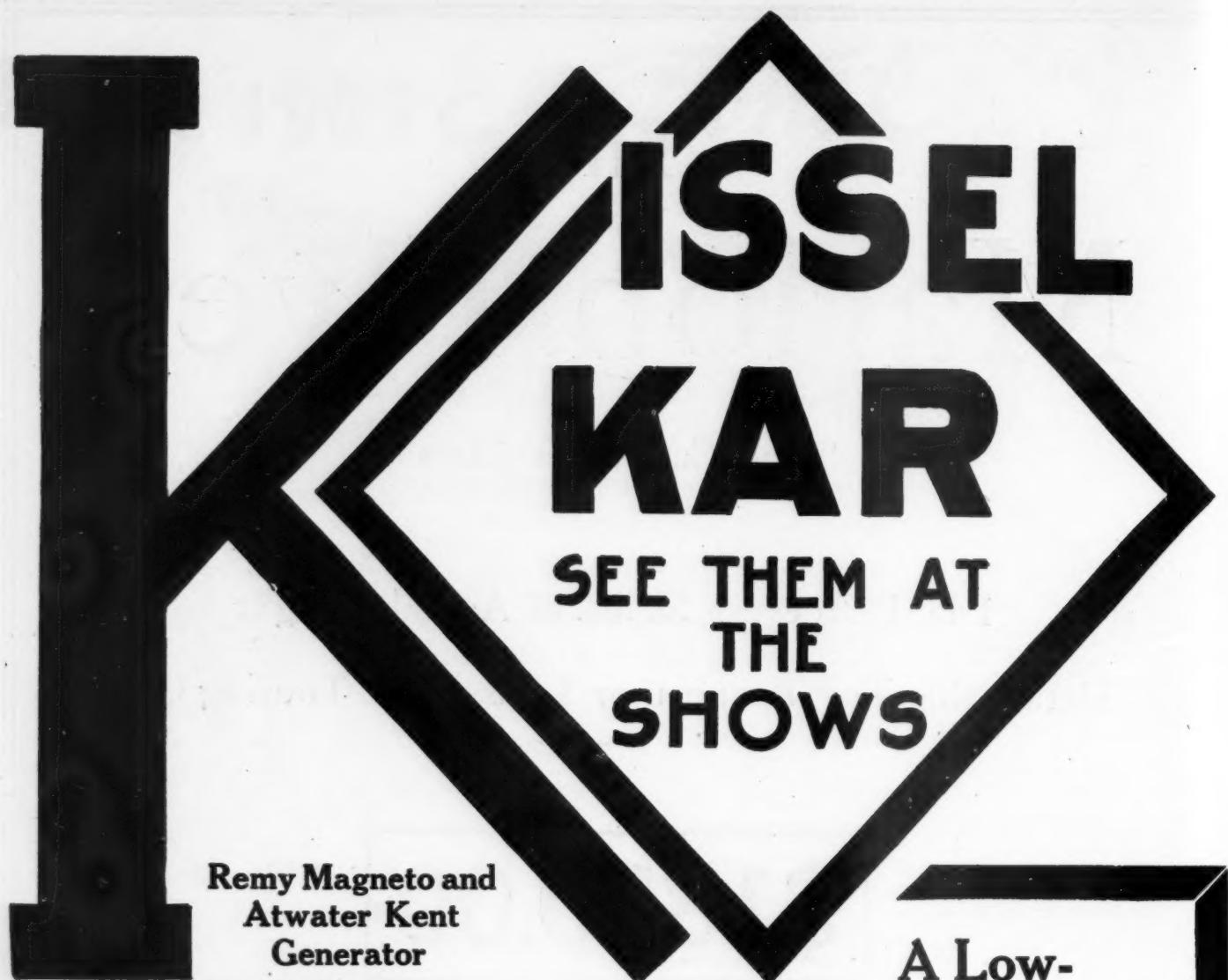
Detachable Toy Tonneau or 5 Passenger Touring Car

\$1850.00

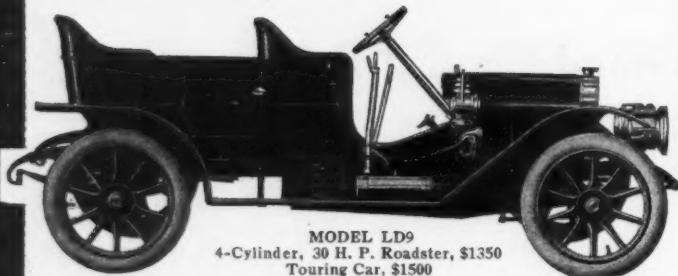
We shall exhibit at Grand Central Palace

Dec. 31-Jan. 7

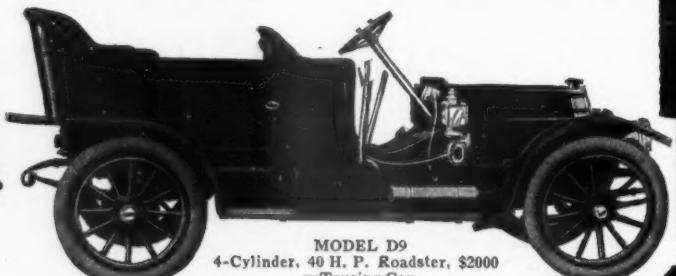
Marion Motor Car Sales Co.
Indianapolis, Ind.



A Low-
Priced Car—All Quality



MODEL LD9
4-Cylinder, 30 H. P. Roadster, \$1350
Touring Car, \$1500



MODEL D9
4-Cylinder, 40 H. P. Roadster, \$2000
—Touring Car.

See them at the Shows, and, if you are going to be open minded about buying a car it will mean a saving of as much as a thousand dollars. Kissel Kars have the same construction and features as cars costing from \$3000 up. Double Ignition, $\frac{3}{4}$ Elliptic Springs, Floating Type Rear Axle, I Beam Front Axle, Timken Roller Bearings throughout and two on rear axle in-

Model D9 is a five and seven passenger car; Model LD9, four and five passenger. That's the only difference. See these cars at the Shows. Write today for catalog and name your local dealer.

stead of one as an extra provision to secure perfect alignment. Remy Magneto with single unit coil, or Atwater Kent Generator and Dry Cells on Model D9, and on Model G9, the 6-cylinder, 60 h. p., \$3000 Kissel Kar, and Remy Magneto with single unit coil, and dry cells on Model LD9.

Kissel Motor Car Company 121 Kissel Avenue **Hartford, Wis.**

"CAR COMING!"

We Will
NOT
Exhibit At
The Shows

We Will
NOT
Exhibit At
The Shows

■ "In building the Velie Automobiles, we have sought to employ the same correct, modern and economical methods of manufacture that have brought so prominently into good repute, the vehicle of the same name."

Velie Motor Vehicle Co.

Chicago Branch
1615-17 Michigan Ave.

MOLINE,
ILLINOIS

\$1750

F. O. B. MOLINE

\$1750

F. O. B. MOLINE

EQUIPPED with Magneto, Speedometer, Glass Front, 5 Lamps, Generator, Jack and Tools. Guaranteed

The "Velie 30" has a 30-H P Motor, Selective-Type Transmission, Floating Type of Axle, 110-inch Wheel Base. Touring Car, Baby Tonneau, and Roadster
AGENTS—THERE ARE REASONS WHY THIS AGENCY IS VALUABLE TO YOU

Our Mr. H. C. Moore will
be at the New Astor
House, during Show
Week, Dec. 31 to Jan. 7.

Write for Reasons and Details

VELIE MOTOR VEHICLE CO.

FACTORY,
MOLINE, ILLINOIS

1615-17 MICHIGAN AVENUE,
CHICAGO



New Models, to be known as the
“PERFECTED”
GREAT CHADWICK SIXES
 Will be shown for the first time
 at the
Grand Central Palace Show, New York

We have abandoned yearly models and standardize The “Perfected Car” which will be exhibited in Touring Car, Tourabout, Runabout and Chassis.

The above illustration is of the victorious test car.

This car made its initial appearance in the Wilkesbarre Hill-Climb May 30, 1908, at which time it shattered all records. Since that time it has won all the big hill-climbs of 1908 in which it was entered, and would easily have won the Vanderbilt Cup Race had it not been for a crippled magneto in the seventh lap. Thus we have tried and tested the new perfected models, exact duplicates of which with the various bodies are being initially exhibited.

IMPROVEMENTS

Note the following improvements in the “Perfected” Great Chadwick Sixes initially exhibited at Grand Central Palace, New York:

WHEEL BASE—Seven-passenger Touring Car and Tourabout, 130"; Racing Runabout type, 112".

BRAKES—Four very large and improved brakes, equipped with air-cooled shoes 1 3/4" in thickness, instantly adjustable.

CLUTCH—Improved internal expanding type. The band can be entirely removed for inspection in 30 seconds.

DRIVE—The only ABSOLUTELY SILENT chain drive in existence—sprockets and chrome nickel steel chains are so constructed and contained in oil-tight cases that chain noise is completely eliminated in the new model.

MAGNETO—Improved Bosch high tension, equipped with perfected advance device, which insures easy starting on quarter turn without use of the battery system.

HORSE-POWER—An absolute increase of 35 per cent in power; this great increase is obtained by refinements and improvements, while the bore of 5" and stroke of 6" remains the same as in 1908 model.

LUBRICATOR—Improved; the flexible shaft has been replaced with a direct shaft drive.

COOLING—A most efficient type of Honey-Comb Radiator is used in place of the cellular type.

TIMING—Hardened chrome nickel-steel time gears, cam shaft and cams accurately ground by special grinding machines, valve lifts readily adjustable.

SPRINGS—Exhaustive tests of the improved suspension have demonstrated greatly increased resiliency and stability.

STEERING GEAR—New Chadwick system of gear, instantly adjustable with large heavy steering post and 10" wheel. The new steering device is made of chrome nickel steel throughout. The band sectors on wheel controlling the gas and spark are of a new and perfected type.

CONTROL—The gear shift lever, segment and locking device are much heavier and the design is improved. The emergency brake lever is also heavier, while clutch, foot brake and foot accelerator are all adjustable for position and refined in appearance.

BODIES—The bodies are much larger, while the workmanship and material are the very best that careful attention and unrestricted expenditure can obtain.

Apply for literature and address communications to Department S

CHADWICK ENGINEERING WORKS
POTTSTOWN, PA., U. S. A.

The Acme

"ACME" SEXTUPLET

6-Cylinder—50 H. P.

\$4,500

**THE
ACME MOTOR CAR CO.
READING, PA.**

At the Grand Central Palace Show, December 31 to January 7, '09, we will exhibit the following 1909 models

The Special "Quad"

(Type XXVII)

Four Cylinders, 5 x 5 in. 5 or 7 Seats
\$3,750

The Standard "Quad"

(Type XXVI)

Four Cylinders, 4½ x 5 in. 5 or 7 Seats
\$3,500

The "Acme" Sextuplet

(Type XX)

Six Cylinders, 4½ x 5 in. 5 or 7 Seats
\$4,500

The "Fairmount" Sextuplet

(Type XXI)

Six Cylinders, 4½ x 5 in. Roadster or Tourabout
\$4,500

The Acme "Midget"

(Type XIX)

Four Cyl., 4½ x 5 in. 2 passengers, shaft drive
\$2,500

The "Vanderbilt" Acme

(Type XXV)

Six Cylinders, 5 x 5 in. 5 or 7 Seats
\$6,000

**We Have a Limited Amount of Unoccupied Agency Territory which
We Will Close at the Show**



**IF YOU'VE DECIDED
TO BUY AN AUTOMOBILE**

AN AD FULL OF ADJECTIVES—a page of pretty platitudes will not suffice to appease your craving for facts and figures—if you've made up your mind you will buy a car and it's now only a matter of deciding which car will best suit your particular needs.

YOU WANT INFORMATION—some facts you can tie to—some points you can compare—and the more the better—with similar points in other cars.

SO WE WON'T WASTE WORDS in this ad—we'll give you facts boiled down in the form of complete specifications showing just how the E-M-F "30" is made, of what, and why.

YOU'LL FIND BY COMPARISON that this car is a full-sized, 5-passenger automobile. Same dimensions as other cars selling for twice as much, and larger—much larger—than any other car selling for the same price.

IF YOU ARE VERSED in the mechanical lore of motor car construction you will find all you desire here. If you don't know, then you know someone who does know—and the more he knows about points that spell superiority in a car the stronger will be his verdict in favor of the E-M-F "30."

AFTER YOU HAVE DIGESTED THIS thoroughly look up the nearest E-M-F "30" dealer—there are 500 of them—and arrange for a demonstration—that will settle the question.

**Magneto Included,
of Course.**

SPECIFICATIONS:

MOTOR—HORSE POWER—30.

TYPE. 4 cylinder, Vertical, 4 cycle. Cylinders cast in pairs with water jackets integral. *Water space between cylinders* ensuring uniform expansion and contraction. Valves all one side. Mechanically operated. Interchangeable.

CYLINDERS. Bore 4". Stroke 4½". Compression—moderate. All experience has proven these cylinder dimensions to be nearly ideal for all kinds of service. They give a motor of moderate speed—which means long life. Cooling, lubricating and all other troubles which arise from short stroke, excessive bore, small exhaust valves and short bearings are entirely eliminated in the E-M-F "30."

CRANK CASE. Cast from highest grade aluminum. Hand hole covers, stamped steel. Instead of the usual cast aluminum arms for supporting motor in frame the E-M-F. motor is carried on pressed steel members in "U" section—no heavier—three times as strong.

VALVES. Are extra large—2½"—made from special steel, drop forged. Stems and seats ground. Valve guides machined and pressed into place instead of being cast integral with cylinders—easily replaced when worn.

All engineers agree that large valves not only make for efficiency, but also for economy. A four cylinder motor of 4" x 4½" may, by scientific design, accurate workmanship and large valves, be made to develop 30 to 35 horse power at 1,000 revolutions per minute, or it may develop 16—if valves are under-size or the design faulty in other ways.

VALVE PORTS. Inlet and exhaust passages very large and unobstructed—eliminating all chance of eddy-currents, insuring maximum power efficiency and perfect cooling qualities.

VALVE OPERATION. Single cam-shaft made from high-grade steel, drop forged with all cams integral. After mill-

ing, cam-shaft is case hardened, and all cam surfaces as well as bearings are ground to micrometrical accuracy—guarantees silent running and consistent performance at all times.

CRANK SHAFT. Is off-set ¾" from centre line of cylinders—still another increase in power efficiency with minimum of wear on cylinder walls and pistons. Crank shaft, drop forged from special steel. Three main bearings—all large and extra long. *All bearing surfaces ground.* Flange, forged integral on crank shaft carries fly-wheel—ground to insure perfect centre. Fly-wheel is also given a running balance at maximum motor speed to insure accuracy and absence of vibration.

CRANK SHAFT BEARINGS. Special babbitt ("White metal" alloy) in accordance with best modern practice. Cam-shaft bearings, phosphor-bronze.

CONNECTING RODS. Drop forged steel. I-beam cross section. Crank-pin bearing equal length each side of centre—not off-set. Piston pin bearings, phosphor-bronze. Wrist pin bearings, marine type—not hinged. Lined with die-cast babbitt. Shims provided for adjustment, which is easily made through large hand holes in bottom of crank case.

PISTONS. Extra long—5"—insuring good compression and long life. Each piston ground, fitted with four rings, and each set is weighed to insure perfect balance of reciprocating parts—a talking-point with some makers—a matter of course with us.

PISTON RINGS. Eccentric type; ground on periphery-face to conform to exact bore of cylinder; also on both sides.

PISTON PIN. Special case-hardened steel ground; drilled hollow to insure perfect lubrication. Pistons, connecting rods, crank-shafts and all reciprocating parts are mechanically balanced to eliminate vibration.

LUBRICATION. Splash—automatic, vacuum feed—reliable

and economical. Oil reservoir cast integral with aluminum crank case. After having tried countless mechanical "positive feed" oiling devices and found them all wanting in some particular, foremost engineers have decided that the only really positive feed is by gravity; and experience proves that no amount of piping to cylinders and bearings will insure the same liberal oiling to all moving parts as the old, original splash system, by which the entire mechanism is kept constantly bathed in oil. The one shortcoming of the gravity feed system was the necessity for throttling the feed to prevent flooding, and the tubes frequently became clogged at the valves.

By our system a vacuum regulation—the utilization of one of the simplest principles in nature—we are able to use large tubes, $\frac{3}{8}$ ". This absolutely insures free flow of oil from the reservoir, and a constant level in the crank case. Radius: on one filling of oil reservoir, 300 to 500 miles, according to road conditions.

COTTER PINS. lock-nuts, keys and taper pins are used at every point to guard against any part getting loose.

OIL CUPS. Are provided for every joint that may at any time require lubrication—steering knuckles, spring connections, operating shafts, etc., etc.

IGNITION. Double system, consisting of (a) magneto, (b) battery. The magneto is not an extra or "special equipment." It is as much a part of the E-M-F. motor as the valves, and is included in the list price of the car. Gears and all moving parts inclosed in oil tight, dust and water proof case. In this regard the E-M-F. car sets a pace for the world, high-priced cars included.

ENGINE GEARS. Cam-shaft and Magneto gears all inclosed and separated from crank chamber. Gears lubricated by non-fluid grease—not cylinder oil.

COOLING. Is by large centrifugal pump—high efficiency at slow engine speeds insuring cooling in hill climbing and hard pulling over muddy roads. Belt driven, stamped steel fan mounted on engine—not attached to radiator. Eccentric belt adjustment.

CARBURETOR. Improved simple float, single jet—our own design. Very flexible and economical. Carburetor is located on driver's side of motor, away from hot exhaust pipes and other parts—readily accessible.

CLUTCH. Improved expanding-ring type. Leather faced. Contained in fly-wheel. Oil groove in fly-wheel with holes drilled for escape of oil obviates all liability of clutch slipping from this cause. Takes hold gently—and holds when engaged. Adjustment, accessible and easy.

TRANSMISSION—Type—Selective sliding gear. Gear case integral with differential housing in rear axle—"the unit power transmission system" so generally approved by engineers of late. Gears made from E-M-F. formula special steel. Accurately cut and oil treated. Instead of squared shaft for sliding gears, round shaft with four keys integral has been adopted—key-ways milled and ground. *Gear centers also ground* to insure perfect alignment on shaft and silent running—details of construction heretofore known only to the highest priced cars.

SPEEDS. Three forward and reverse—direct on third.

GEAR RATIO. Standard, $3\frac{1}{4}$ to 1. Speed of car, 50 miles an hour, down to 2 (you won't believe it till we show you), on high.

DRIVE. Direct through universal jointed propeller shaft to bevel gear on differential. Two universal joints. Pressed steel torque shaft. Gears extra large, accurately cut and made from special alloy steel.

DIFFERENTIAL. Bevel gear type—four pinions—another feature heretofore considered too expensive for any but high-priced cars.

REAR AXLE. E-M-F. exclusive design. Right and left housing sections drawn from sheet steel and heat treated, giving extra strength. Fitted with truss rods. Hyatt Roller Bearings in hardened and ground removable sleeves carry load. Differential thrust bearings, babbitt between ground steel washers. No balls to split—no adjustment to get out of order. Made right to stay right. Thrust of drive pinion supported by Timken Roller Bearing.

Auto-genous welding—acetylene-oxygen process—discussed so much in engineering circles and trade journals of late is used in this axle as well as in several other parts of the car.

Thanks to drawn steel, auto-genous welding and "clean"

design this axle is lighter than any other live or floating axle on cars of similar weight and power—notwithstanding the entire transmission mechanism is incorporated in it.

All gears—transmission and differential—as well as all shifting mechanism, are immersed in an oil bath. And the transmission-axle case as well as motor-crank case are absolutely oil tight—no mucking of floor boards or dripping on pavements. Provision is made to prevent the oil working out at the axle ends when the car is left standing on an incline. Liberal road clearance.

FRONT AXLE. I-beam type. Drop forged in one piece—not welded in centre. Heat treated. Spring perches forged integral. Liberal safety factor. Spindles off-set back of yoke-posts—scientifically correct—affords easy steering, with tendency to go in straight line. Steering knuckles and all connections drop forged from steel—no castings. Two-point ball bearings on hubs and all joints bronze bushed.

STEERING GEAR. Irreversible, worm and sector made from special steel case hardened. All bearing surface ground. Connection from steering arm, at right, to left knuckle arm, obviates all tendency to "crankiness" on rough roads.

CONTROL. Gear-shift lever at right of driver. Throttle and spark levers on left side of steering post, below wheel—operated by fingers of left hand without releasing grasp on wheel. Right hand free for emergency brake and gear shifting—the ideal control, rapidly superseding the fad for levers on top of wheel. Auxiliary foot accelerator. Clutch operated by left foot, service brake by right foot. Emergency brake by hand lever on right—ratchet lock.

WHEELS. Artillery type. Large spokes—12. Spokes and felloes first grade second growth hickory.

TIRES. $32'' \times 3\frac{1}{2}''$ on all wheels. Morgan & Wright. Universal quick-detachable rims.

BRAKES. Four—all acting on rear hubs—none on transmission. Service brake, contracting steel bands, camel-hair lined, acting on pressed steel drums integral with rear hubs. Emergency brakes, internal expanding rings in same drum—metal-to-metal. Both sets double acting. Grip on drum is intensified by motion of car after brakes have been applied. Service brakes being on outside renders adjustment easy. Pressed steel disc closes drum making it dust proof.

SPRINGS. Front, semi-elliptic. Rear, full elliptic. Extra wide for this weight of car— $2\frac{1}{2}$ ". Driving thrusts and braking strains taken by two radius rods—not by springs.

FRAME. Pressed steel—U-section. Side members straight—weakened neither by off-setting nor dropping.

MUFFLER. E-M-F. design, silent. Silences by radiation—not by obstruction. Absolutely no back-pressure.

FENDERS. Enamelled steel in the newest style, most approved enclosed-full-length-of-the-car type.

WHEEL BASE. 106". **TREAD.** Standard— $56\frac{1}{2}''$. Special gear for Southern Roads 61".

WEIGHT. Touring Car slightly under 1,800 pounds.

GASOLINE CAPACITY. 15 gallons. **OIL.** 1 gallon.

COLOR. E-M-F. Red.

MATERIALS. Cylinders made from special formula highest grade, fine grain, gray iron. Intake pipe, brass. Exhaust pipe, gray iron. Crank case, aluminum. Frame, gears, springs, axles and driving shafts all made from special steels—each from an alloy best suited to its peculiar service, and all from E-M-F. formula. Operating levers, spring supports, spring clips, shackles, bracket rod-ends, etc., steel, heat treated. All smaller parts, not drop forged, are pressed or stamped steel—no malleable castings enter into the construction of the car—maximum strength with minimum weight, and absolute assurance of the safety factor desired.

BODY TYPES.

TOURING CAR. 5 passenger, roomy tonneau with liberal leg room. Latest style, most approved, straight-line type. Handsomely finished.

The "TOURABOUT"—an E-M-F. innovation. A classy 4-passenger car. Rear seats detachable, leaving room for trunks and baggage. A rumble seat is included in regular equipment; when attached makes a natty 3-passenger roadster.

PRICE. With standard equipment, pair acetylene headlights, and generator; side oil lamps, tail lamp, lamp brackets, tube horn, tire repair kit and tools—magneto included, of course—\$1,250 F. O. B. Detroit, Mich.

We will Exhibit at the Madison Square Garden Show, January 16 to 23, 1909

Everitt-Metzger-Flanders Co., Detroit, Michigan

Members Association Licensed Automobile Manufacturers

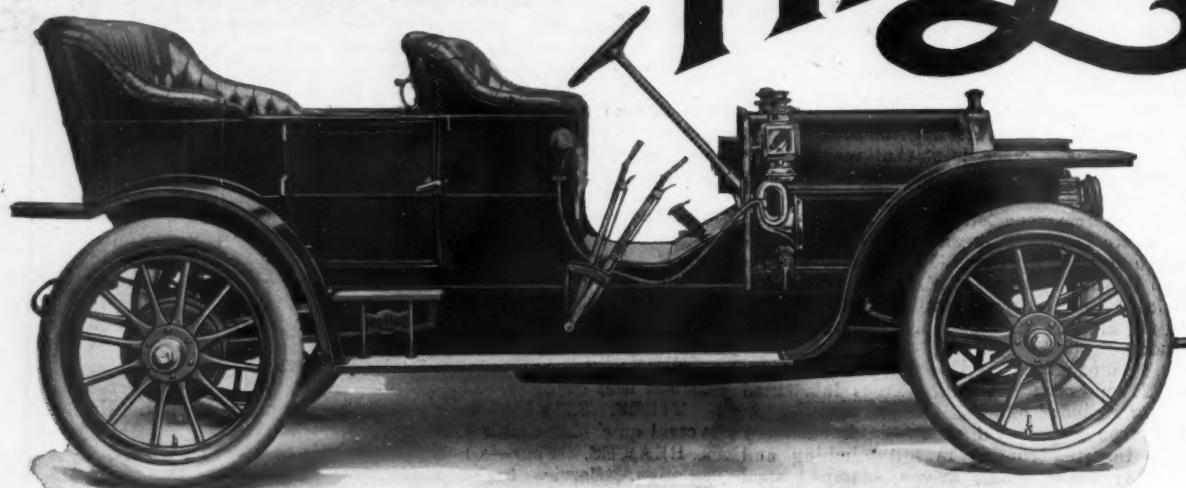
1909

MODEL G-9, \$2250

A High Grade Car at a Medium Price

THE MIDLAND SYSTEM:

To build the best motor we can;
 Install it in the easiest riding car we can,
 And then set the lowest price we can.



MIDLAND

BUILT RIGHT

LOOKS RIGHT

STAYS RIGHT

We believe results are better in building a car and setting the price to fit than in setting a price and building the car to fit. Our price is the lowest ever quoted on a car of Midland quality—the highest quality.

THE MIDLAND 1909 TOURING CAR—MODEL G-9, \$2250

Shown in the cut, is the acme of our efforts.

It will be seen in space D-30 at the Grand Central Palace Show, which opens in New York the night of December 31, 1908. It will also be seen in space Q-2 at the Chicago Show, which opens February 6, 1909.

It is BUILT RIGHT.

We use only the best materials.

We look to detail. The ratio of bore and stroke and diameters of valves is correct, the cam action is right, the power and weight are correctly proportioned.

Our margin of profit is small, and instead of spending our money on "contests" and "freak advertising," we spend it for improvements on the machinery and workmanship on Midland Cars.

LOOKS RIGHT

Its outward appearance is stylish, neat and trim. The finish is perfect, the lines are pleasant.

STAYS RIGHT

We know how to get the best material and machinery and how to put it into a car to the best advantage. These economies mean not only economy for the buyer, but strength and durability for the car.

The mechanism is simple and easily accessible, enabling any owner to attend to his own car.

Its motor is lighter, stronger, more powerful and more convenient to oil, clean and examine than any other four-cylinder motor on the market.

The whole power plant is put into the smallest space compatible with the best results and is all on a sub-frame.

The engine has few parts, and therefore small chance of getting out of order.

The crank shaft is "offset," so that the full power of the explosions acts on the pistons just when the crank is at the easiest turning point. This reduces friction to the minimum.

The wheel base is 118 inches, and the body is hung between the axles. This insures not only long life to the car but comfort and ease to the passengers.

Excellent workmanship on its machinery does away with "end-shake" and consequent noise.

A small friction brake and torsion shock absorber makes changing of gears quiet and easy.

Read the specifications carefully.

The Midland will run 5 to 50 miles an hour on the high gear.

Midland Model "E," 25-30 h. p., \$1,800; Model "F," 30-35 h. p., \$2,250, and Model "F-9," 30-35, \$2,250, are equally high class in design and workmanship to the model shown here.

Every car that leaves the Midland factory is perfect in every part and has been thoroughly tested before it is shipped. The Midland is 100 per cent right from head to tail light.

"MIDLAND" MODEL "G-9" SPECIFICATIONS

Thirty to thirty-five h. p., four cylinders, water-cooled, 4½-5¼, cast in pairs and offset. Valves all on one side; bearings best nickel babbitt. Floating disc clutch with cork inserts; roller bearings and ball bearing thrust collar; small brake enables noiseless gear change; coil spring torsion shock absorber; selective transmission, three forward speeds, one reverse; nickel steel gears; positive pump lubrication, all in crank case; Remy magneto and dry cell ignition; worm and nut irreversible steering; spark and throttle levers above steering wheel; auxiliary foot throttle; pressed steel frame with up-shoot over rear axle; special Timken axles; full floating rear; one piece "I" beam front; internal and external brakes with 2½-inch face and 14-inch drum, "Thermoid" lining; wheel base, 118 inches; 36x4 Firestone tires; semi-elliptical front springs, full elliptical rear; Midland flat vertical tube radiator; six-blade ball bearing fan; straight line touring car body; carries five passengers with ample room for two small extra seats; "Midland" red color, rich and durable; carries two gas lamps and generator; two dash oil lamps and rear oil lamps; tube horn; tool kit in canvas case; tire repair outfit and jack. PRICE \$2,250

SEE A MIDLAND AT THE SHOWS BEFORE YOU BUY

THE MIDLAND MOTOR CAR CO., MOLINE, ILL.

A Personal Invitation to Every Dealer
and Prospective Motorist at the Grand
Central Palace Show to Visit the Exhibit of

Simply
Perfect



"The Aristocrat of Moderate Priced Cars"

Perfectly
Simple

I want you to see the Maxwell at the Grand Central Palace show.

In the making of the Maxwell it has been my belief that we could not afford to use anything but the best materials, because a moderate-priced car, to be as successful as the Maxwell is known to be, must be more durable than the highest-priced cars—because in the very nature of things they receive harder service and less expert attention.

I consider Mr. J. D. Maxwell the foremost automobile designer of the world. Practical to

the extreme, Maxwell cars are simple, and because of their simplicity—reliable.

You know that Maxwell principles—principles which have been built in these cars since 1904.

We have issued a magazine; like the foundation of Maxwell success, it is the result of mutual effort. So we call it "The Cooperator." Ask for a copy at the Maxwell booth.

Berry Briscoe

President.

MAXWELL-BRISCOE MOTOR CO.

The Maxwell Principles

Thermo-Syphon Cooling
Three Point Suspension

Multiple Disc Clutch
Unit Construction

Shaft Drive
Metal Bodies

The Maxwell Line—Magneto Equipped

30 H. P. Four Cylinder Touring Car or Roadster.....	\$1750.00
20 H. P. Two Cylinder Touring Car or Roadster, fully equipped.....	\$1450.00-\$1325.00
14 H. P. Two Cylinder Tourabout, fully equipped.....	\$825.00
10 H. P. Two Cylinder Maxwell Junior.....	\$500.00

Get posted now—ask for a catalogue, or better, arrange
at our Exhibit for a Maxwell demonstration.

Maxwell-Briscoe Motor Co.

P. O. Box 104

Main Office and Factory: TARRYTOWN, N. Y.
PAWTUCKET, R. I. NEW CASTLE, IND.



THE RICKETTS SIX

H. P., 30-35

Price, \$1475

Will be at the
CHICAGO SHOW
Coliseum, Feb. 6-13, 1909

Don't fail to see this wonderful car before you decide on your 1909 purchase. The "Ricketts Six" is a well designed, perfectly balanced production, employing only the best materials, high grade in every particular and built for satisfactory service and withal has pleasing lines and is comfortable to ride in.

SOME OF "RICKETTS SIX" SPECIFICATIONS

Motor—Six-cylinder, 3 $\frac{1}{2}$ " bore, 4" stroke, 30-35 H. P.
 Transmission—Selective, three speeds forward and reverse, multiple disc clutch.
 Axle—Rear, semi-floating type; front, I-beam.

Frame—Pressed steel.
 Bearings—Hyatt roller on rear wheels, H.-B. ball on front wheels.
 Wheel base—116 inches.
 Brakes—Internal expanding, extra lever.
 Ignition—Double system with Splitdorf magneto.

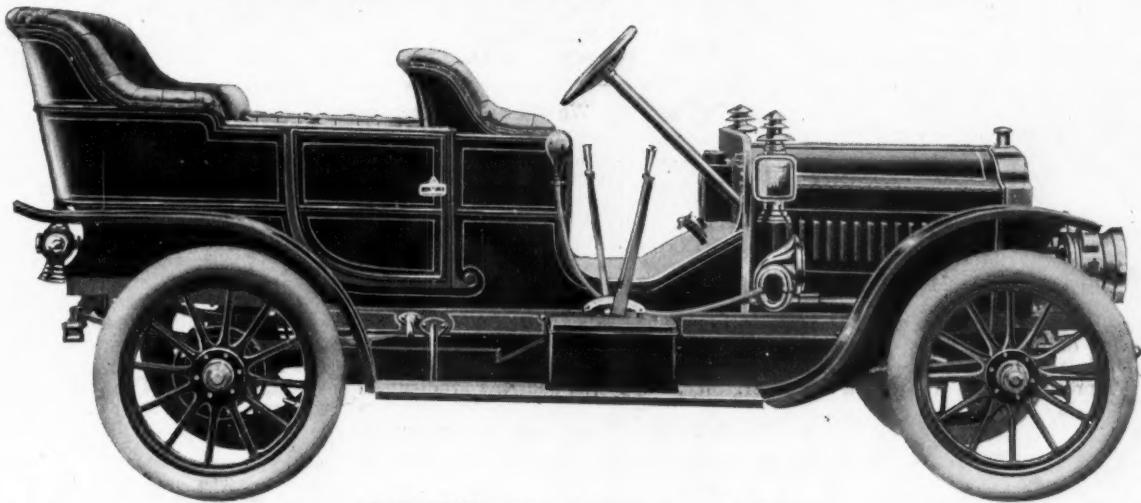
Carburetor—Schebler.
 Tires—32x3 $\frac{1}{2}$.
 Weight—1,800 pounds, fully equipped.
 Three Point Suspension—Chrome Nickel Steel.
 Shafts—Straight Line Drive.

Equipment includes 2 Gas Lamps, Generator, 3 Oil Lamps, Horn and Tools

SEND FOR DESCRIPTIVE MATTER

**RICKETTS AUTOMOBILE WORKS
SOUTH BEND, INDIANA**

Your Purchase of Any Four Cycle Car is
 Your Perpetual, Unbreakable Contract
 with Troubles—Troubles entirely
 unknown to the Elmore Owner



1909 Three Cylinder, \$1,750
 Four Cylinder, \$2,500

Right now you are most likely considering the purchase of some four-cycle car.

The question that vexes most is whether it shall be one with a four-cylinder or a six-cylinder engine.

But that which seems so important to you shrivels to insignificance before the greater question of four-cycle or two-cycle.

For on the latter—*entirely* on the latter—depends your future satisfaction with the car you buy.

Yes, the very life of the car itself is prematurely shortened, or indefinitely prolonged, by the principle of its motor—four-cycle or two-cycle.

If you understood the Elmore valveless two-cycle car there could be no question in your mind. Your decision in favor of the Elmore would be a foregone conclusion.

You would know why the Elmore runs and runs and runs, with never a bit of unnecessary trouble or exaspera-

tion or expense—just as every present Elmore owner knows.

You would realize what you don't know now—how all-powerful is the influence of valves.

The Elmore engine has no valves; it produces the smooth, constant rhythm of power known as continuous torque—something that no four-cycle engine, no matter how many cylinders it has, can do.

These differences are comprehensively explained in the 1909 literature. Get it and study it until you are perfectly familiar with the Elmore valveless two-cycle engine.

Then seek the Elmore dealer and a demonstration of the car. The dealer has been allotted as many cars as he can obtain, so you realize the necessity of deciding without delay.



The Elmore Mfg. Co., 804 Amanda St., Clyde, Ohio

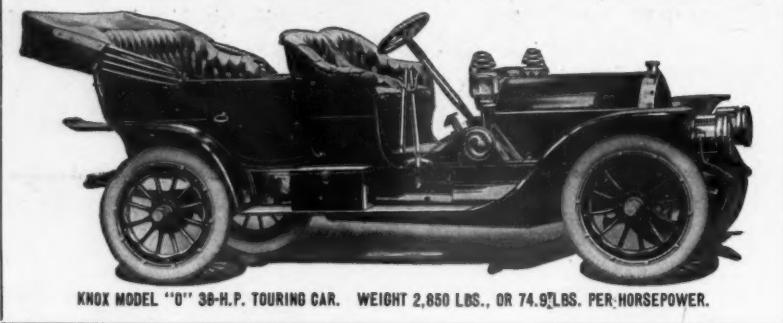
Member Association of Licensed Automobile Manufacturers

The Elmore will be exhibited only at the Madison Square Garden Show,
 New York, January 16-23. Study it there.

KNOX WEIGHT PROPORTIONATE TO HORSEPOWER

The proper weight in proportion to the power is a point very carefully considered by the motor car manufacturer. Any maker can build cars with this point in mind, but to build one that will withstand hard use and still be comparatively light requires the careful working out of all parts so that continued shocks and strains will prove their ability to stand hard service.

In designing Models "M" and "O" we have used our best endeavors to keep the weight as low as is consistent, and the following table will prove that we are considerably under the average maker when size and rated horsepower are taken into consideration:



KNOX MODEL "O" 38-H.P. TOURING CAR. WEIGHT 2,850 LBS., OR 74.9 LBS. PER HORSEPOWER.

Model.	Weight as catalogued.	Rated power A. L. A. M. formula.	Pounds per rated H.P.
"O" Touring Car.....	2,850 lbs.	38.025	74.9
"O" Roadster	2,650 lbs.	38.025	69.6
"O" Tonneauette	2,800 lbs.	38.025	73.65
"O" Limousine	3,000 lbs.	38.025	78.9
"M" Touring Car.....	3,850 lbs.	55.	70.
"M" Limousine	4,350 lbs.	55.	79.
"M" Roadster	3,200 lbs.	55.	58.

Knox ability to win contests has been fully demonstrated in contests of 1908, and their ability to win customers is being proved daily.

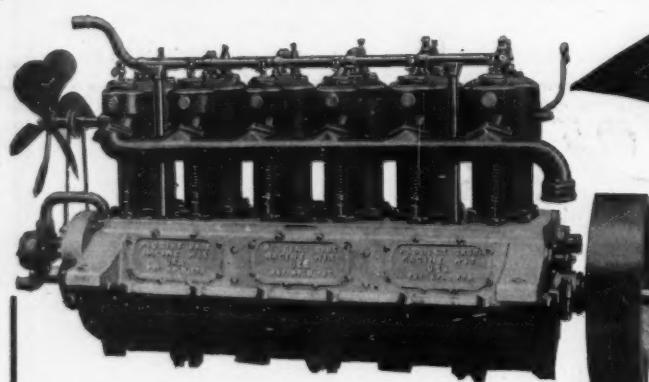
Mr. Dealer: The cars having the most good qualities are the easiest as well as the best to sell.

Good representatives wanted in open territory. We will show at Madison Square Garden Show, Space 1, and Chicago show, Space G-2.

Write for catalogue and information.

Knox Automobile Company, Springfield, Mass.

Member A. L. A. M.



THIS IS THE MOTOR

that runs so quietly that a penny will stand on edge on the base of the car while the motor runs or a nickel will stand on edge on the fender.

AND THIS IS THE CAR

which is becoming more famous daily for its luxurious beauty and splendid efficiency.

PIGGINS

THE NAME THAT STANDS FOR PERFECTION IN HIGH CLASS AUTOMOBILE BUILDING

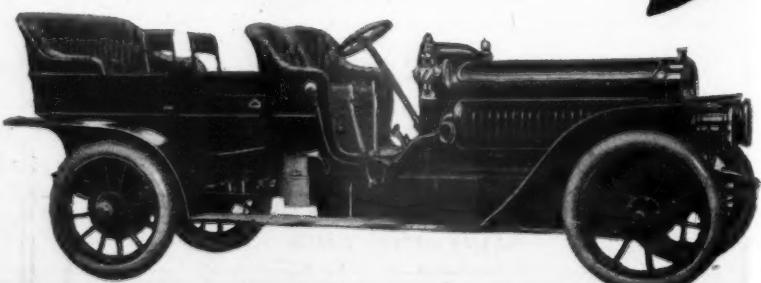
If you are thinking of a high class automobile, look at this for

\$3,500

Don't forget that we are the only firm manufacturing a high class car that divides the profits liberally with the purchaser.

Let us send you the most valuable kind of information concerning high class cars

PIGGINS BROS., RACINE, WISCONSIN.



Motoring Satisfaction

with Stearns Cars is Genuine



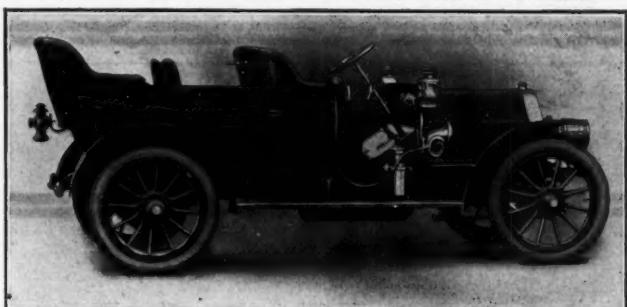
OUR 30-60 H. P. Model is ideal for those devotees who appreciate abundant reserve power, and a car as nearly perfect as is humanly possible.

Catalog upon request

The F. B. Stearns Co.

Member A. L. A. M.

Cleveland, Ohio



"GO WITH A GAETH"

Go Slow about Closing With Any Manufacturer or Representing Any Car Until You Have Received Our Proposition and Seen

THE GAETH

We have four models for the dealer to handle—7-Passenger Touring Car, Short-Coupled Body, Tourabout and Limousine. All \$3,500, except the last. There's not a better car made at the price and not a better car to profitably represent. Write us—Dept. MA—for particulars today.

THE GAETH AUTOMOBILE CO.
CLEVELAND, OHIO
Member A. M. C. M. A.

PALMER-SINGER



ALL CARS SOLD BY US ARE LICENSED UNDER SELDEN PATENT AND GUARANTEED FOR ONE YEAR

\$3,500



The Palmer-Singer Town and Country Car, 1909 Model, Type XXX-2B, is now being exhibited and delivered. It is the most serviceable car on the market today. Its 28-30 H. P. motor provides ample power to take its full complement of passengers on long, hard tours over any road at a very good speed. Closed, it is a beautiful, luxurious Town Car, seating four inside, ideal for the purpose and far superior to many foreign makes at double the price. A glance at the specifications will show the remarkable value it offers.

Nickel steel is used to give lightness and strength. Imported F. and S. ball bearings exclusively. Bosch high tension magneto and multiple disc clutches. Drop forged I beam, front axle—four-speed selective type, sliding gear transmission with direct drive on third speed. All brakes equalized, all expanding type and on rear wheels. Universal joints on all steering connections. Shaft driven, all moving parts enclosed in dustproof cases.

Palmer & Singer Mfg. Co.

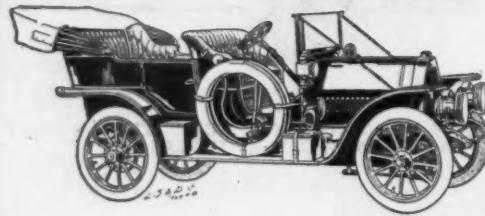
1620-22-24 Broadway, N. Y. 1321 Michigan Ave., Chicago
Sole Distributors the Simplex

Winner of International 24-hour race at Brighton Beach, Oct. 2d and 3d, and holder of 16 new World's Records

**Exhibiting at
Madison Square Garden Show**

THE "JEWEL" 40" TOURING CAR

SPECIFICATIONS



MOTOR—Rutenber, 4½" bore, 5" stroke.
IGNITION—Two independent systems.
MAGNETO—Bosch. Type H. D. h.
COIL—Connecticut.
BATTERY—Exide.
LUBRICATION—Self-contained system.
TRANSMISSION—Selective type.
BEARINGS—Timken.
WHEEL BASE—120".
WHEELS—36".
TIRES—4" front, 4½" rear. Any make.

FRAME—Pressed steel.
SPRINGS—Semi-elliptic front, platform rear.
FRONT AXLE—One piece forging 1 section.
REAR AXLE—Full floating clutch driven type.
BRAKES—Two on each rear wheel.
BODY—Seven passenger.
EQUIPMENT—Two gas lamps, two side oil lamps, tail light, Prest-O-Lite Gas Tank, Hartford Shock Absorber, tire irons, trunk rack, speedometer and clock.

Write for 1909 Catalog

THE FOREST CITY MOTOR CAR COMPANY

121 Walnut Street, MASSILLON, OHIO, U. S. A.

Matheson

1909 Prices Reduced \$1,000

In order to sell hereafter this highest of all high grade cars at the prices of the cheaper cars, we have INCREASED OUR WORKING CAPITAL BY \$350,000 and will DOUBLE OUR FACTORY OUTPUT. Send for our book of customers' letters telling of the experiences of the most prominent men of affairs in this country with their Matheson cars, covering thousands of miles of service every where.



	New Price	Former Price
50 H. P. 1909 Touring Car.....	\$4,500	\$5,500
50 H. P. 1909 Roadster.....	4,350	5,000
50 H. P. 1909 Runabout.....	4,350	5,000
50 H. P. Limousine.....	5,500	6,500
50 H. P. 1909 Landaulet.....	5,500	6,500

MATHESON AUTOMOBILE CO.

Main Sales Office, 1886-1888 Broadway, New York City
Dealers wanted in all open territory

The Thomas-Flyer Champion Endurance Car of the World

Send 25 cents in stamps to cover cost of mailing, and we will send you a beautifully illustrated story on the New York to Paris Race. 115 illustrations. Address Department M.

E. R. THOMAS MOTOR COMPANY
BUFFALO, N. Y.

Member A. L. A. M.



Specifications: 4 Cylinder 5x5½. Eisemann dual ignition. Disc clutch. Selective type transmission. Full chrome nickel steel axles equipped with Timken Roller Bearings. Floating type rear axle. Front springs semi-elliptic. Rear platform. 120" wheelbase. 34x4½ tires.

Send for catalog giving full details
METEOR MOTOR CAR COMPANY, DAVENPORT, IOWA

STERLING

1909

Sterling Cars are Sterling Value

ELKHART MOTOR CAR CO.
ELKHART, INDIANA

The MOLINE Nineteen-Niner

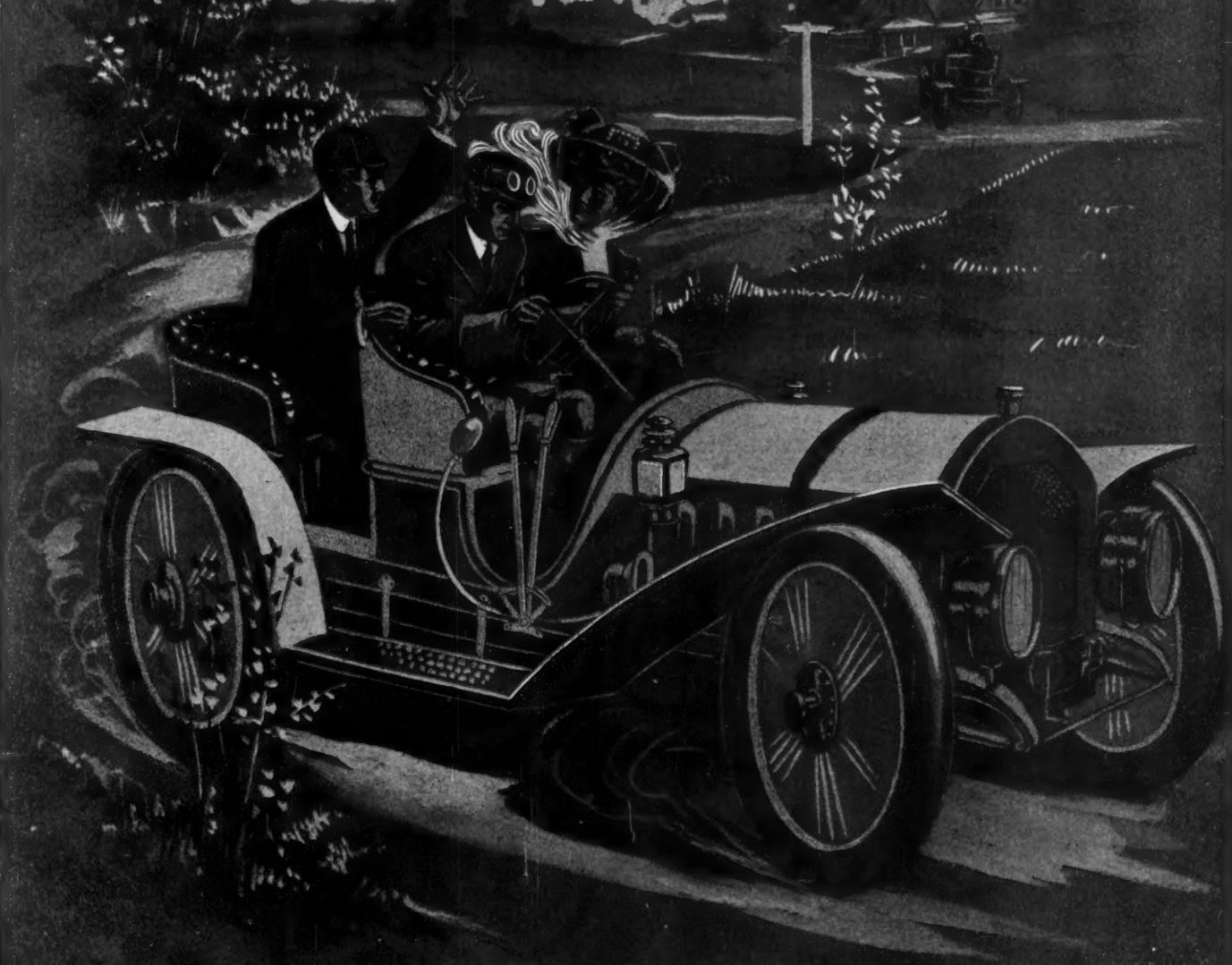


Three Point
Suspension Unit
Power Plant.
Lots of Power
and Speed—a

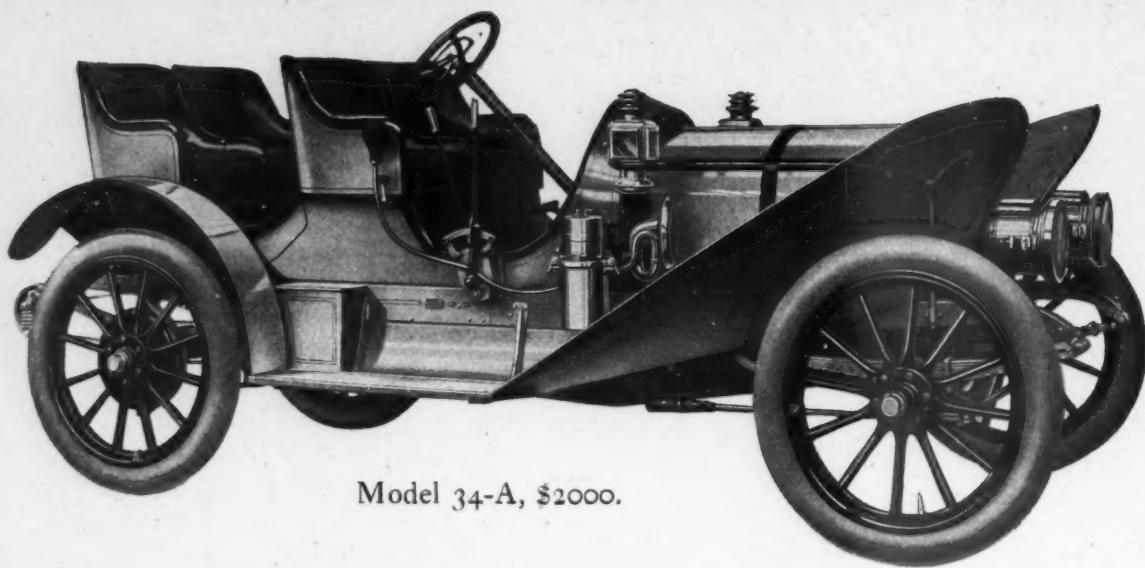
Hill Defier and Time Annihilator. Every Working Part Easily Accessible. Magneto when desired.

MOLINE AUTOMOBILE CO. EAST MOLINE, ILLINOIS
Standard Manufacturers A. M. C. M. A.

Roadster and Runabout Section



INCLUDING
All Cars Below the Light Touring Car Class.



A BIG RAMBLER YEAR

Dealers who have shared the Rambler success of the past year—a big Rambler year—know of the absolute satisfaction the new Ramblers have given.

No other make at anywhere near Rambler prices approaches the Rambler in quality and exclusive features. The line to be exhibited at the Rambler show, 38-40 W. 62nd St., New York, includes some new models never before shown. These will interest every live dealer in open territory.

Rambler
The Car with the Offset Crank Shaft

Have you seen the Rambler Spare Wheel operated? Call at the Rambler show and we will demonstrate to you how it can be substituted for the regular wheel within three minutes.

During all New York shows Ramblers will be shown and demonstrated at the new Rambler Branch, 38-40 W. 62nd Street, New York. Telephone Columbus 4511; give your address and we will call for you.

Thomas B. Jeffery & Company
Main Office and Factory, Kenosha, Wis.



Utility of the Runabout

WITH the final separation of the runabout from the light touring car, the runabout as a type stands alone, and is limited in its application to just the service it was originally intended to satisfy. This is fortunate for the runabout, because its reputation has sustained severe injury in every case in which the little car has been compelled to "tote" a tonneau.

In a way, the extra service imposed upon the runabout types has augured for advancement in that the wheelbase and other essential dimensions were increased from time to time, in the evolution of the runabout, in the direction of the light touring car. The wheelbase should be more than it was in earlier times, because easy riding qualities do not abound in conjunction with speed and a contracted wheelbase, although it is true for every wheelbase lengths there are limits of speed wherewith the car will perform satisfactorily.

It is not now uncommon to find runabout types of cars with even four-cylinder motors rated at approximately 20-horsepower, while double opposed motors of from 15 to 20-horsepower are common, and the single cylinder motors are designed to be from 10 to 14-horsepower, so that the power available in nearly every single instance indicates that the wheelbase should be long. Fortunately, for the patrons of the industry, designers have not been stingy in this direction.

The earlier examples of runabout types of cars were designed with a wheelbase even as low as 60 inches, while today it is not uncommon to observe cars in which the dimension referred to even exceeds 90 inches. There is all the difference in the world in the performance of a car with a 90-inch wheelbase as against the performance of a car with even 80-inch wheelbase, and when it comes to the performance of a car with a 60-inch wheelbase, the speed is absolutely limited to a point far below that at present attainable.

Relations of Speed, Weight, and Power

If a car is too light, it will be limited in speed in considering easy riding qualities, because it will not stay on the ground. On the other hand, if a car is too heavy, considering the power of the motor, it will not attain speed. There is a very intimate relation, all things considered, between the power of the motor, the weight of the car, and the obtainable speed. To reflect the entire situation, it will be necessary to call attention to the fact that the attainable speed is a matter involving the diameter of the wheels as well. The harmonious relation of the elements that go to indicate easy riding qualities, speed, hill climbing ability, and radius of action, was not present in cars even up to recent times, because the relations were not well defined and experience was necessary in order to bring about the desired harmony.

The more recent products come very close to perfection in these respects, and designers are alive to the fact that it is useless to add power without affording the conditions essential to the utilization of the same. The same designers learned that it is futile to add weight if the addition is in the vertical plane instead of through the good office of a lengthened wheelbase, and they fully realize that the weight of an automobile should be measured in pounds per foot of length, which is not to deny that fully 60 per cent of the total weight should be concentrated at the point of contact of the driving wheels.

The Transmission and Means of Control

It is in the runabout type of car that the planetary gear is in its right element. It is sometimes said of the planetary gear that it is "fool proof." This appellation is not only crude, but it fails to represent the splendid qualities of the planetary type of gear. Among the noteworthy virtues of this type of gear will be recorded its absence of any considerable weight in pounds, the small space it occupies, and the fact that it can be stowed away in a more or less obscure situation, because it is completely housed in and there is no occasion for getting at it while it is in working order, nor would it be an advantage to be able to get at it were it out of order. The planetary type of gear has all the virtues of a chronometer. When it works, which it does for a long time, it requires no attention whatsoever, unless to keep the cavity more or less full of oil, and when it wears out, to replace it is the natural thing to do. This type of gear is much used on the runabouts at the present time, and it is even used on some touring cars, which is an indication of its ability quite in excess of the needs in so far as the runabout type of car is concerned.

This type of gear gives two speeds and reverse. In the high speed, the gears and pinions remain still, and the whole unit revolves. The gears thus locked are noiseless; equally it is true, they are subjected to no actual wear at all. The cars are light enough considering the power of the motors, so that it is a very bad road indeed requiring the use of the low gear. The control is so perfectly simple, and so free from any complication, such as would make it possible for the system to get out of order, that it is easy enough to account for the appellation of "fool proof."

The runabouts are not all of the shaft-drive genera, although the shaft drive is more predominant in connection with runabouts than it is with cars of more power. The length of the propeller shaft is invariably a maximum, because the planetary gear is short, and the motor, too, takes up a very little of the available longitudinal distance. Even if sliding gears are used, to which there can be no possible objection (on the ground that they even work in the very largest types of cars), they will not take up a great length in the runabout types, because they do not have to be designed to transmit a large amount of power. It is a matter of expediency, as between the two types of gears, the shaft or the chain drive, the live rear axle or not. Each of the types are represented and merit resides in the cars of the respective methods of construction.

The Utilization of Space

If the motor is under the bonnet in front, and the front line of the cooler is even with the center of the front axle, which is true in most of the cases, the front edge of the seat comes about 48 inches back of the center line of the axle. Considering the proper depth of the seat and depending upon the wheelbase, the free space back of the seat approximates 30 inches. This space can either be used in connection with a rumble seat, or it affords a very roomy platform or place for a box of light construction for any utility purpose. The rumble seat is much in vogue at the present time. It is positively a great advantage to have one, and if the gasoline tank is located elsewhere, a space under the rumble seat becomes at once available for a tool box.

In the past very little attention was given to the utilization

of the available space; in many cases it was even difficult to find a place in which to store such tools and accessories as positively must be taken along with the car. In the best examples of the runabout type of cars to be seen today the small details are adequately cared for and the cars of the type under discussion will serve many useful purposes. They become the ideal doctor's rig, increasing the radius of practice, assuring ability to keep appointments, and they perform the service at a cost below that of the horse-drawn carriage.

The Fuel Consumption

The best types of single cylinder runabouts will make from 20 to 30 miles on a gallon of gasoline, and the quantity of lubricating oil required per mile is almost negligible. Increasing the number of cylinders seems to have the effect of increasing the fuel consumption for a given travel, the reason for which lies very largely in the fact that with increasing power the obtainable speed is greater, and reasonable autoists must expect to pay for a little more fuel if they attain a considerable increase in speed. Under certain conditions it is economical to use more gasoline, because with increasing speed more distance can be covered, which is an advantage that can be measured in dollars. When the advantage in dollars considerably exceeds the cost of the increased fuel, it is high time to fix the conditions requiring the increased fuel.

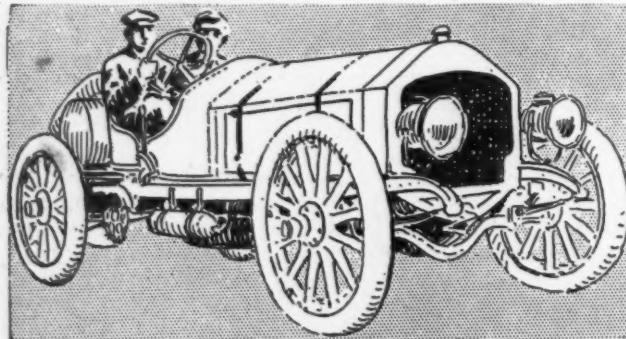
In some of the earlier examples involving the double opposed motor, the fuel consumption was augmented through the imperfection due to the use of a carburetor for each cylinder. This defect, like a great many other minor imperfections, has disappeared, and in the most up-to-date type of these cars as seen today a further fuel economy may be anticipated because of improvements in the ignition system.

The Spring Suspension

The runabout types of cars with the positively short wheelbase were rendered easy riding through the use of "concord" (buckboard) types of springs, but with increasing length of the wheelbase the concord types of springs were abandoned, in view of the difficulties involved resulting in sagging on an unequal basis. It took some little time to design half elliptical and even full elliptical springs, such as would afford a certain suppleness of action without coming down on the axles. Like everything else, it is a problem that has been fairly solved, and the spring action of the runabout types of cars is up to a fairly high standard at the present time.

The Body Work

It is pleasing to note that the bodies of the runabout types of cars are now on a high plane. It finally became a recognized fact that the runabout types of cars filled a niche on a utility basis, and that they were more for utility than they were for pleasure. Under such conditions, the bodies have to stand more



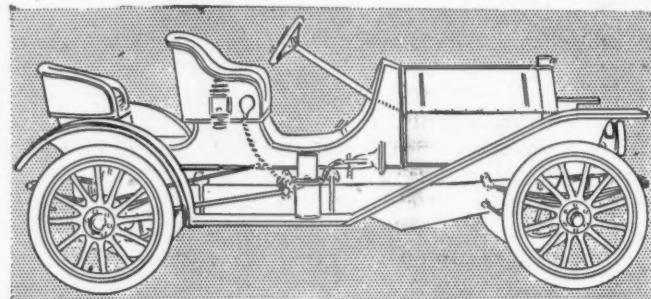
HIGH POWERED TYPE ROADSTER

washing, the cars are more likely to be out in inclement weather, and the cheaply constructed wooden affair would scarcely serve for any length of time with such arduous work.

The new types of bodies have a certain straight line effect that is positively agreeable in contrast with some of the earlier phantasies, and if they are made of wood they are put together in a definite way, rather to the exclusion of glue and putty. Many of them are made of metal, and on the whole they will stand inclement weather, the washing, and the service. Another point in relation to the finish: the idea of the high carriage finish is a little out of place on a runabout, and a very sensible practice of using a fine grade of paint made of lead with a little zinc and pure oil, colored to suit, is taking the place of an expensive carriage finish, and properly so. The finish on the latter-day cars has the virtue of costing very much less, of looking better in the long run (service considered), and the paint acts as a preservative for the body, preventing the wood from checking and the iron from rusting.

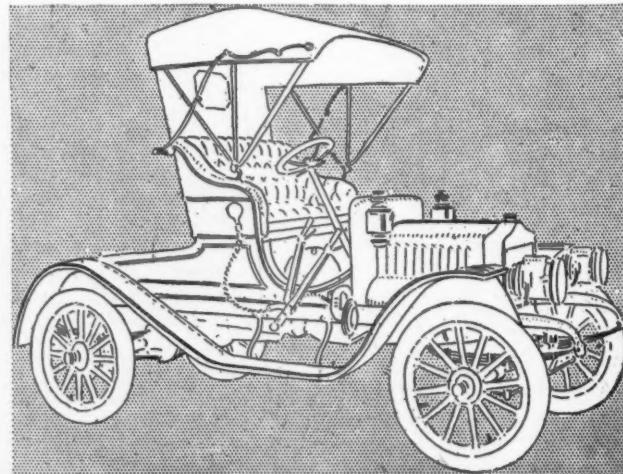
The Last Word

In a hundred ways, the details of the runabout types of cars are on a far higher plane than they were before. A reflection of the trend of the runabout industry would seem to indicate

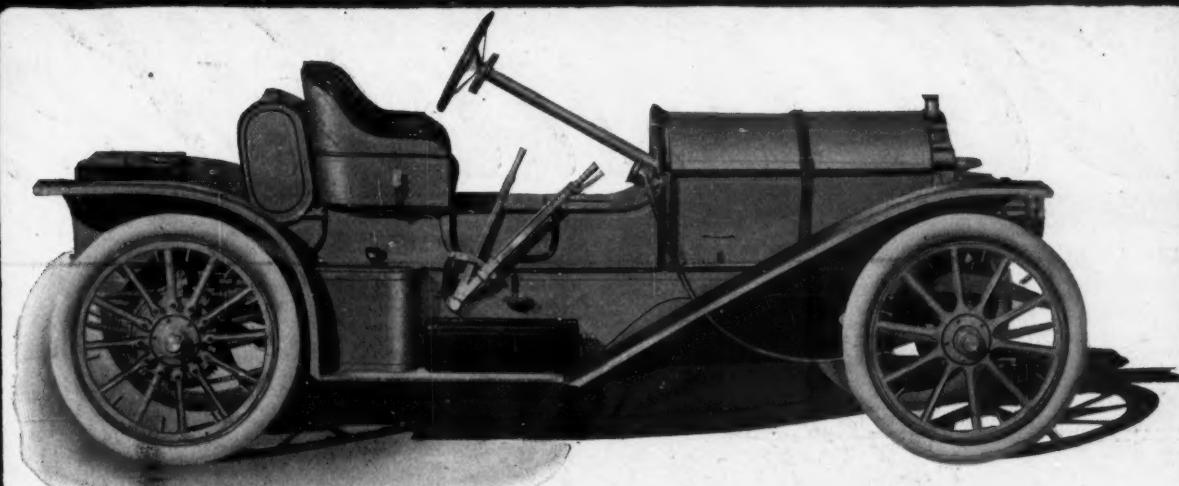


TYPICAL ROADSTER TYPE

that it will be one of the largest and most important branches of the automobile trade in the not far distant future. These cars are economical to maintain, they are speedy enough, they are a utility proposition in divers ways. No matter how many big automobiles an autoist may have in his garage, he cannot afford to be without a runabout any more than a battleship fleet can afford to be without torpedo boats. The runabout types of cars are, as it were, the "mosquito fleet" of the automobile squadron, and they are just as necessary (because of their nimbleness and utility) as any of the other cars.



DOCTOR'S RUNABOUT



PETREL

PETREL "6" ROADSTER \$2,500.00

Motor—6 cylinder, 4 $\frac{1}{2}$ x 4 $\frac{1}{4}$.
Ignition—Double, with U & H Magneto, with self-starting attachment.

Cooling—Water Centrifugal Pump.

Drive—Waite Friction, Double Chain.

Frame—Pressed Steel.

Wheels—Salisbury Artillery.

Tires—36x4.

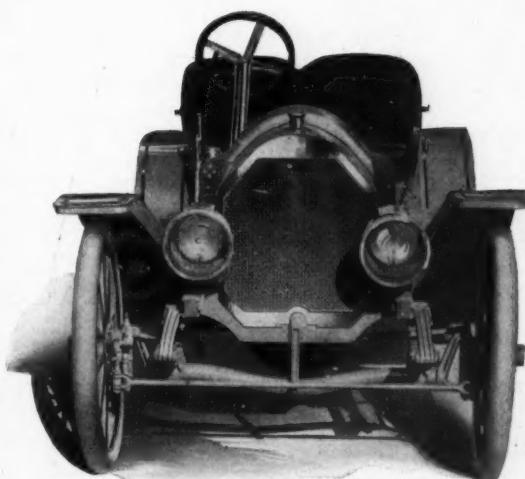
Gasoline—Tank Capacity 20 gallons, Gravity Feed.

Upholstery—Plain Imported Patent Leather.

Wheel Base—116".
Standard Color—English Violet with Black and Gold Stripping, Piano Finish.

Equipment—Full set Electric Lamps with special 6-80 battery, 50 - hour capacity; Horn, Speedometer, Tool Kit, Trunk with two suit cases.

PETREL "6" TOURING CAR, same specifications with 5-passenger body, no trunk, \$2,500.00.



PETREL "4" ROADSTER \$1,350.00

Motor—4-cylinder, 4 $\frac{1}{2}$ x 4 $\frac{1}{4}$.
Ignition—Battery and coil, Jump Spark.

Drive—Waite Friction, Double Chain.

Frame—Pressed Steel.

Wheels—Salisbury Artillery.

Tires—32x3 $\frac{1}{2}$.

Gasoline—Tank Capacity 20 gallons, Gravity Feed.

Upholstery—Plain Imported Patent Leather.

Wheel Base—106".
Standard Color—English Violet with Black and Gold Stripping.

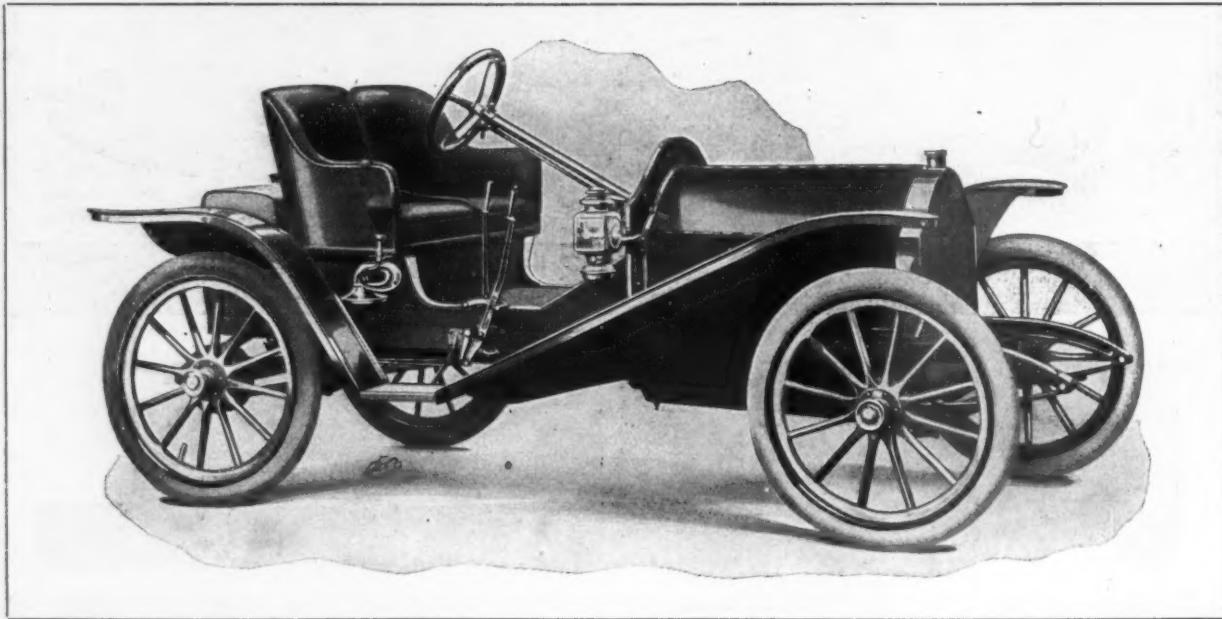
Equipment—Full set lamps, horn, trunk with two suit cases.

"PETREL 4" TOURING CAR—Same Specifications, with Five-Passenger Body, 115" wheel base. No Trunk, \$1,500.00.

**"Petrels" are Silent, Sure, Swift. Get There.
Look and Sound Well While They Do It.**

PETREL MOTOR CAR CO., Kenosha, Wis.

Hupmobile



\$750.00

\$750.00

Four Cylinder, 16-20 H. P., Water Cooled Motor.
Sliding Gear Transmission, Shaft Drive.

Bosch High Tension Magneto.

Starts on half turn of crank.

Dispensing with Coil, Batteries and Connecting Wires.

Wheel Base, eighty-six inches.

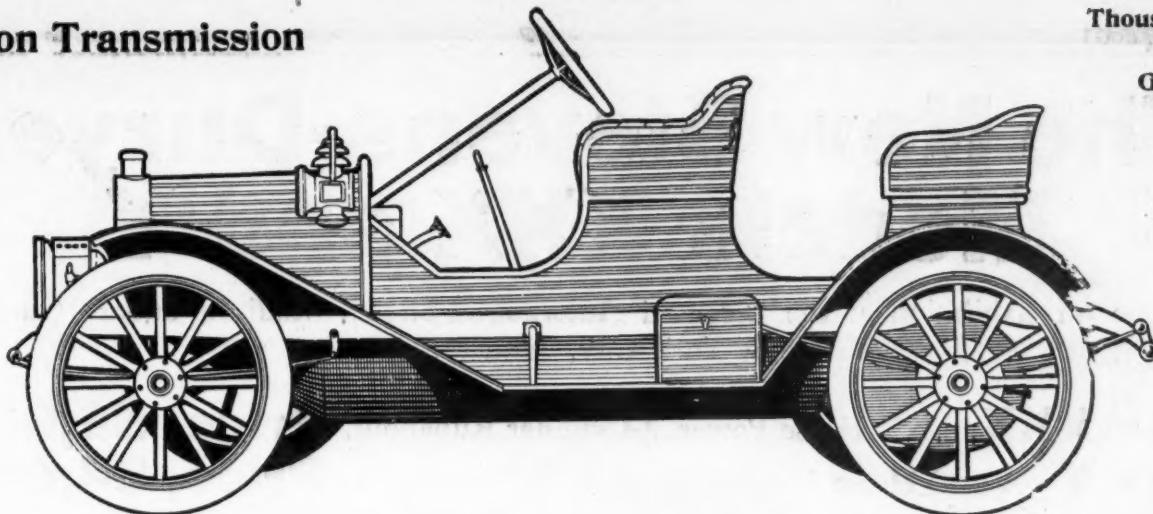
Weight, complete with equipment, 1,100 lbs.

Speed, 45 miles an hour.

DESIGNS BY E. A. NELSON

HUPP MOTOR CAR CO.
Bellevue and St. Paul Aves., Detroit, Mich.

Friction Transmission



Thousand Dollar
Cartercar
Gentlemen's
Roadster
Model "H"

Become a Motorist Without a Motorist's Troubles

Many have come to believe that "troubles" are a necessary part of motoring.

The thorns that come with roses.

Their experiences have never been different.

The clutch—the geared transmission—the universal joints—the bevel gears—the water pump—all have come in for their share of "trouble."

The Cartercar eliminates troubles by doing away with the troublesome parts with its Friction Transmission.

It is a simple car—so simple, indeed, that there is hardly anything to get out of repair.

It has no clutch to slip—
No gears to strip—

No grease packings to renew—

No water pump to clog—
No noise to annoy—

And only one control lever.

If you have driven other automobiles you will better appreciate what this means.

The Cartercar has a thousand speeds. You can travel

from zero up to forty miles per hour.

You can follow a loaded truck on a crowded street without danger of stalling the motor, or speed to your heart's content.

The Cartercar will travel any road any automobile will travel and many that others will not.

It will climb a 50 per cent grade with a full load.

With our patented aluminum housing, the chain runs in a bath of heavy oil, protected from dust and dirt.

It makes it absolutely noiseless, and in connection with our Friction Transmission, is the smoothest running drive yet invented.

The fundamental principles in the Cartercar have always remained the same. Changes have been of a refining and modernizing nature.

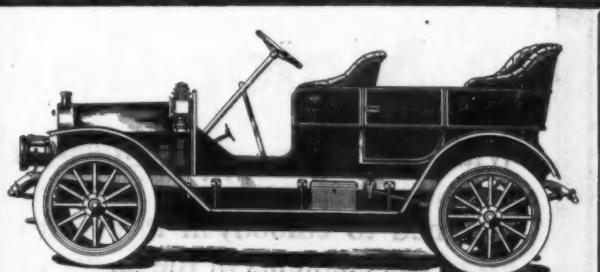
It is not an experiment nor the untried product of an over-confident engineer.

The Cartercar is a high grade, practical automobile of the finest type.

Agents who have sold the Cartercar year after year to their nearest friends will tell you about it.

They will tell you of those who have driven over 4,000 miles and have spent only \$3 for repairs—of 4,500 mile trips without even tire trouble—of 7,000 miles in six months for less than \$100—and of boys who take all the care of the car in their father's garage.

Write and we will give you the nearest agent's name and forward literature about our Model "C" Delivery Car, Model "E" Folding Tonneau, Model "G" Roadster, Model "H" Thousand-Dollar Runabout or Model "K" five-passenger Touring Car, Coupes, Landaulets and Taxicabs.



New Model "K" 5-Passenger Touring Car, \$1,350

It is a beautiful high-grade car with handsome lines conforming with the latest ideas of comfort and class.

A strictly family car for city use or extended touring. It is light in weight, roomy and the easiest riding car ever produced.

It has our simplified double opposed 22-24 horsepower motor.

Carburetor, commutator, etc., easy to reach and adjust.

Lubricator under the hood over motor, avoiding dirt and grease.

Carter patented Friction Transmission, one lever control, noiseless chain drive in dust and oil tight aluminum housing.

Price \$1,350, f. o. b. Pontiac.

See us at the Grand Central Palace Show, New York, December 31-January 7.
Chicago Automobile Show, February 6-13.

Cartercar Company

Pontiac, Mich.

Member A. M. C. M. A.

When Writing to Advertisers, Please Mention Motor Age.

The New Stevens-Duryea Models XXX and Y

will be on Exhibition at the Licensed Automobile Show, Madison Square Garden, New York City, January, 1909

The XXX—A 24 Horse Power, 4-Cylinder Runabout, **Price, \$2,850**
The Y—A 6-40 Horse Power, 6-Cylinder Touring Car, **Price, \$4,000**

The 4-Cylinder Model X and 6-Cylinder Model U
 ("Light Six") will also be on view

The above Four Cylinder STEVENS-DURYEA CARS represent our 1909 Productions.
 Write for detailed descriptive matter

Stevens-Duryea Company

705 Main Street,
 CHICOPEE FALLS, MASS.

Member Association Licensed Automobile Manufacturers

A Motor Car for Your Children

With the advent of **BROWNIEKAR** this becomes a possibility, because it is designed to embody in its construction all of the elements of the larger cars, so simplified that a child can easily become an expert in its care and operation.

BROWNIEKAR

Price \$175.00
 F. O. B. Factory



Write for
 Illustrated
 Catalogue

Is the **safest** and most **instructive** toy ever placed in the hands of the children and contains the possibilities of endless healthful amusement combined with a **practical** motoring education.

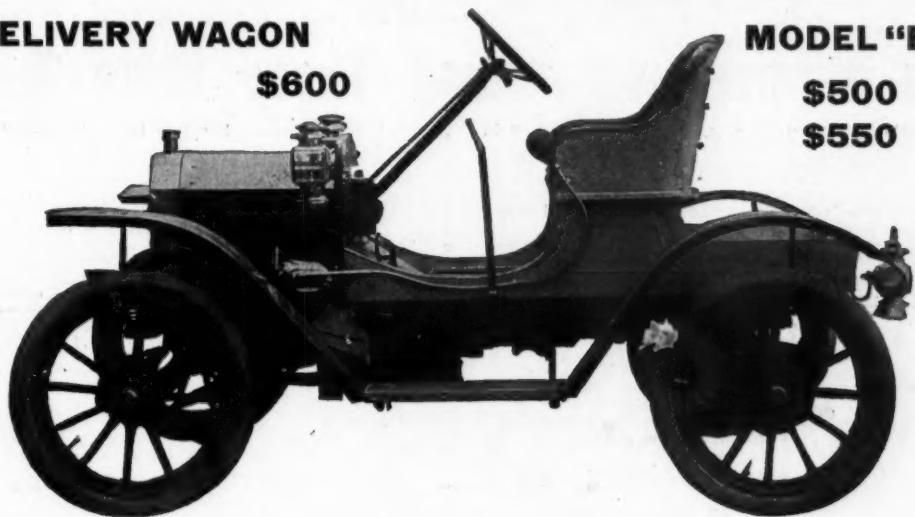
We have an attractive proposition for live agents in unoccupied territory.

OMAR MOTOR COMPANY ²⁷ Siegrist St. Newark, New York

BRUSH RUNABOUT

DELIVERY WAGON

\$600



MODEL "B"

\$500

\$550

See us at the Palace Show, New York, December 31 to January 7

In a certain Michigan town of 1,200 inhabitants a live business man took the Brush Runabout agency last August. So far we have shipped him 12 cars and have (at this writing) his order for another carload of 6.

A western dealer contracted 100 cars for his town for the balance of this fall and all of next season. Up to Dec. 15th we had shipped him four carloads of 10 each or 40 cars, with more on order.

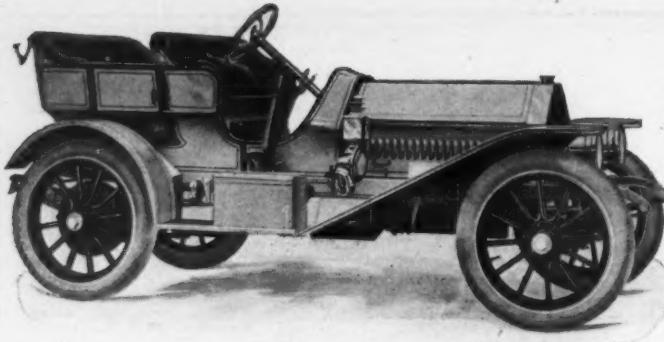
Another dealer has taken 60 cars since September.

A small car is a much harder engineering and manufacturing problem than a big car. We have been through the mill. Since the start, there have been four years of effort put on the Brush Runabout—one year of experiments, one of designing and testing, one of manufacturing, organization and public tryout and one of general use.

It is no dream or hope. We need no dogs to try it on. The car is right because people who drive it find it so. The price is not going up nor the quality down because we *know* our costs, basing that knowledge on actual past experience in quantity production of *this car*. We can afford to make every piece in it good. The car sells. Note we don't say, "Will sell." *It is selling*. The profit sticks to the dealer because he doesn't have to *spend* it all in free repairs.

Do you want territory on it? Some of the most prominent dealers are selling it. It is the *business man* we wish to tie up to.

Brush Runabout Company Member
A.M.C.M.A. **Detroit**



Model "R" Roadster, 45 H. P.

Glide

\$2000

CLOSE COUPLED BODY FURNISHED
Also with Runabout Body Seating Two

You Know Automobiles—Read These Glide Specifications

The Glide is the first car perfect in size, in mechanism and in action that has ever been offered to the public at a correct price.

Many years of automobile building are back of every Glide. Years of fruitful experience that have added to the merits and popularity of GLIDE cars.

The power plant is a 4-cylinder (cast separately), 45 actual H. P. motor. The crankshaft has 5 bearings, not 2 or 3.

A constant level oiling system, eliminating piping and automatically maintaining the proper level of oil in the crankcase at all times.

An improved form of selective type of transmission, located just forward of the rear axle, reducing the angularity of the propeller shaft.

A rear axle with liberal proportioned parts, and of a construction that gives an absolute assurance of perfect work.

A multiple disc clutch with discs of large diameter.

Double set of brakes—internal expanding and external contracting. Brake drums are 16 inches in diameter, 3 inches face—will hold the car on a mountain grade. Absolute confidence in ability to slow down or halt at will is established when Glide brake equipment is examined. No brake system on any American or Foreign car has ever before been so comprehensively treated.

One Universal Joint only in Glide cars, located between the motor and the transmission. Remember there are not two Joints or three Joints, or even four, as in other constructions.

THE BARTHOLOMEW COMPANY,

STANDARD MANUFACTURERS
A. M. C. M. A.

215 Glide St., Peoria, Illinois

Glide cars will be exhibited at the Chicago Show, floor space H-1, immediately at the right of the main entrance—Wabash Ave.

Timken Roller Bearing throughout—all gears of the best Alloy Steel.

36x4 tires all around. Wheel base 106 inches. Remember, tires are all alike, not one size in front and another in the rear, thus obviating the ridiculous necessity of carrying two sizes of spare casings and tubes.

The GLIDE is not an assembled car. It is built in our own shops, the motor excepted.

The GLIDE cars are sold before dealers buy them.

Buyers know that GLIDE cars at \$2,000 and \$2,500 are better than they can get for the same money anywhere else.

They know not only because of our extensive Glide advertising, but also because of Glide demonstrations and widely increasing sales.

Our advertising helps you sell Glide cars—and every sale brings another sale to you.

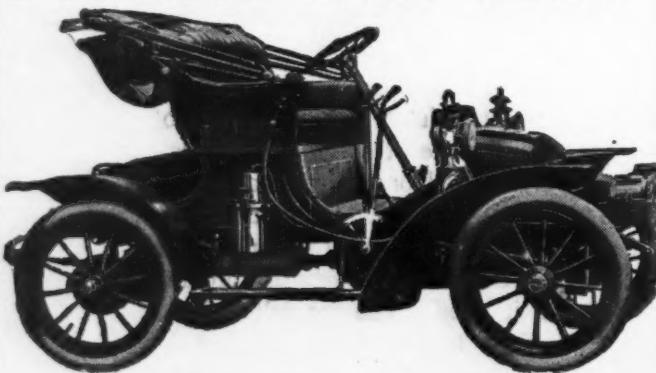
Our position is the one all manufacturers must take sooner or later—giving full value for the price.

We have open territory for live, progressive dealers who want a permanent business built on the growing popularity of the Glide.

Write today for 1908 agency contracts and proofs that the Glide agency is the best proposition you were ever offered.

Glide Model "G" Special Touring Car, 45 H. P.; wheel base 120 inches; 34 x 4½ inch tires—\$2500.00.

The Autocar
BUILT BY BRAINS
For Men Who Know



Type XV, \$800. Write for 1908 Catalog

The general use of this car by physicians in making their daily rounds has earned for it the well deserved appellation—

The Doctor's Car

This car comes to you with full equipment, including top, storm apron, gas lamps and gas generator. It is the easiest car to care for and the most economical to run.

The Autocar Company Member A. M. C. M. Ardmore, Pa.

Its Users Are Buyers

The Automobile Trade Directory is in constant use by Managers, Chief Engineers, Superintendents, Purchasing Agents—the men who design automobiles and who specify and buy the parts and material for their manufacture.

This quality of its circulation makes it one of the best advertising mediums in the field.

Special Service

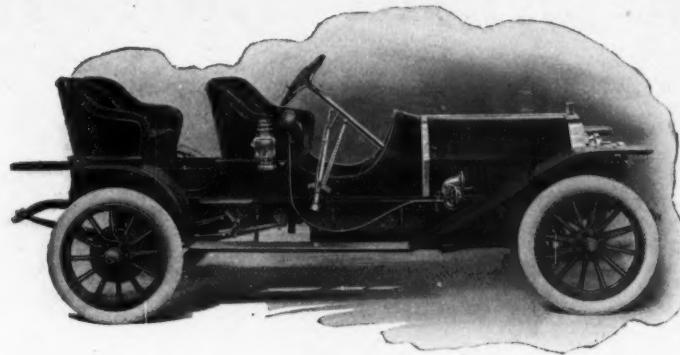
Advertisers are loaned our mailing list, which includes every automobile dealer, garage, repair shop and supply house, and the mechanical engineers and purchasing agents of all automobile factories.

This list is absolutely necessary to complete your follow-up system. Remember the Directory is not read and filed away, but is in constant use by the ACTIVE BUYERS throughout the entire trade. An advertisement costs little—talks long.

**The Rates are Low
Write us**

The AUTOMOBILE Trade DIRECTORY

231-241 W. 39th St., New York



A hundred cars will confront you at the Show.

There will be expensive cars and "cheap" cars, big cars and little cars, cars with this feature, cars with that, all claiming to be the best.

Be Cautious. Look for the car that has plenty of size for comfort, plenty of power for speed and hill climbing, plenty of style for appearance, made throughout of reliable, durable material and selling at a moderate price.

All this you will find in the

1909 *Speedwell*

The price is \$2,500, completely equipped. A marvel of grace, construction, durability and reliability at the highest price that anyone should pay for *any* car.

The Speedwell Motor Car Co.
DAYTON, OHIO

Exhibiting at the Shows.

New York Office, 2002 Broadway at 68th Street.

MR. DEALER

ACT
AT
ONCE

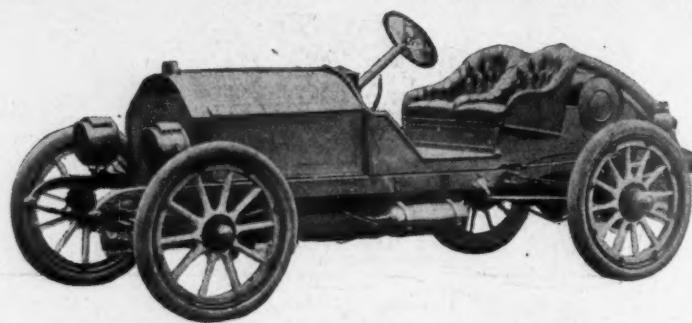
IF you have not received one letter or more from **MOTOR AGE** during the month of December you may rest assured we have no record of your name. **It Will Pay You** to send your name and address at once.

MOTOR AGE, 1200 Michigan Ave., Chicago

CAMERON

AIR COOLED
RUNABOUTS AND TOURING CARS
4-cyl. 20-24 h. p. 3-speed selective
\$900-\$1,100.
6-cyl. 30-36 h. p., \$1,500.
Equipment of all models includes
Remy High Tension Magneto.
CAMERON CAR CO., Beverly, Mass.

The "SHARP ARROW'S"



SUSTAINED SPEED RECORD

(Averaging a mile in 1 Minute, 4 Seconds for 188 Miles)

AN ACKNOWLEDGED AUTOMOBILE ACHIEVEMENT for Stock Cars, the fastest time yet made by an American-built machine, declared by press reports to be "the one big surprise of the race," and "the sensation of the races"—the Vanderbilt Motor Parkway Sweepstakes Races—was not an accident.

The Garden City Event was won on merit by the steady, consistent road work of "SHARP ARROW." One news account said: "This car went along at a sixty-mile rate, until Mr. Sharp saw that he was distancing his field and took it easy."

It was in reality a marvelous feat. "SHARP ARROW" made a new sustained speed record for American Cars on its first attempt, beating the next best car in its own class by 50 minutes, beating the entire class above 15 minutes, and beating all but the two fastest foreign cars, the Isotta and Renault, in the highest class, cars selling for over \$4,000.

No wonder that the amazed contestants protested the car; and claimed that it was out of its class—"a car with \$6,000 machinery in a cheap body." It certainly behaved like a high-priced machine; and kept the pace set by the fastest company with comparative ease. But here are

The Identical Specifications (plus the personality of Wm. H. SHARP) of the 1908 "SHARP ARROW" that won the Garden City Sweepstakes and of every 1909 car that we shall put out:

SPECIFICATIONS—RUNABOUT

WHEEL BASE—106 inches.

TREAD—56 inches.

TIRES—36 x 3½, front; 36 x 4, rear.

RIMS—Michelin quick detachable or plain clincher.

SPRINGS—Half elliptic; 38 inches, front; 54

inches, rear.

FRAME—Pressed steel raised over rear axle, al-

lowing low center of gravity.

HORSEPOWER—40; four cylinder, 5 x 5 inches, cast in pairs.

VALVES—All on one side.

IGNITION—Jump spark; two distinct systems. Connecticut coil with battery and \$150 Bosch magneto.

CARBURETOR—Single jet automatic; water jacketed.

LUBRICATION—Constant level, force feed splash system.

MOTOR CONTROL—Spark and throttle on the steering wheel.

SPECIFICATIONS FOR TOURING CAR

WHEEL BASE—116 inches.

TIRES—36 x 4 inches, front and rear.

WEIGHT—2,300 pounds.

SPEED—60 miles an hour.

THE 106-INCH WHEEL BASE CHASSIS will be equipped with three styles of bodies:

2-PASSENGER BODY with cylindrical gasoline tank back of seats, \$2,750.00.

CATALOGUES ON APPLICATION.

CLUTCH—Leather cone, large diameter.

GEARS—Chrome nickel steel mounted on Hess-

Bright annular ball bearings.

SPEEDS—Three forward and reverse.

DRIVE—Shaft and bevel gear.

REAR AXLE—Full floating clutch type with D.

W. F. annular ball bearings.

FRONT AXLE—One piece I beam drop forged;

cross steering link back of axle.

BRAKES—Transmission brake is operated by foot

pedal; internal hub brakes are operated by the

hand brake through a long equalizing bar.

RADIATOR—Honeycomb.

GASOLINE TANK—Copper.

SHOCK ABSORBERS—Truffault-Hartford, full set

of four.

LAMPS—Three oil lamps, two 8-inch solar gas

lamps with Prest-o-lite tank.

WEIGHT—2,100 lbs. Tanks empty.

SPEED—Over 70 miles an hour, road gear.

SPECIFICATIONS SAME AS RUNABOUT EXCEPTING

2-PASSENGER BODY with tank under seats and luggage compartment in rear, \$2,750.00.

2-PASSENGER BODY admitting of one or two

rumble seats, \$2,750.00.

THE 116-INCH WHEEL BASE CHASSIS will be

equipped with two styles of bodies:

4-PASSENGER TOY TONNEAU, \$2,850.00.

5-PASSENGER TOURING CAR, \$3,650.00.

WILL EXHIBIT AT THE PALACE SHOW.

TRENTON, N. J.

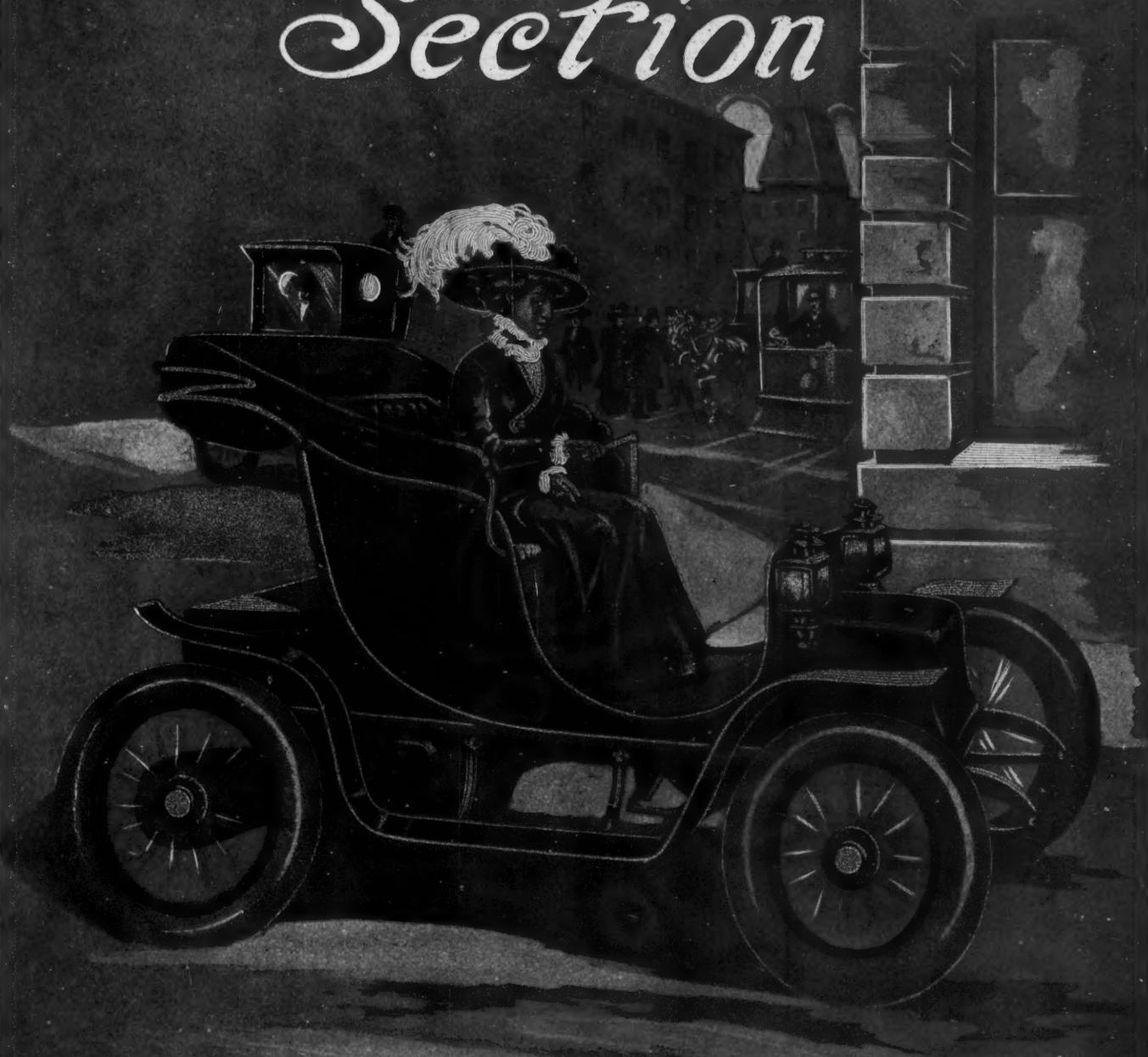
Offices and Factory,

LISTS

Lists of all Automobile Dealers, Garages, Charging Stations, Repair Shops, Dealers and Jobbers of Supplies, Purchasing Agents, Mechanical Engineers, etc. Write for our proposition.

THE AUTOMOBILE TRADE DIRECTORY, 239 W. 39th Street, NEW YORK

Electric Vehicle Section



INCLUDING

The Several Examples of Electrical Vehicles, as Pleasure
Cars, Delivery Wagons, Cabs and Trucks.

Woods



COMFORT
LUXURY
SATISFACTION

THE WINTER ARISTOCRAT

Woods Electrics are the cars for every weather, but more especially in winter are they a delight and satisfaction. They add winter cheer to every user. Their ease of operation, and the comfort they bring, are things to be remembered by every purchaser. Think of the difficulty of operating a heavy limousine winter car and the expense of a chauffeur as compared with a WOODS ELECTRIC, which gives all the comforts and may be operated by any member of the family. You should know about the world's records held by Woods Electrics. Dealers who can see ahead will lose no time in closing for 1909 — The Electric Year.

Write WOODS MOTOR VEHICLE CO., CHICAGO



1908
1909



CONCOMITANT with the advances in electrical vehicles were the improvements wrought in storage batteries. The success of the electrical vehicle depends almost exclusively upon the obtainable success of the battery. The question of the chassis was settled in common for the several modes of automobiles. The electrical motors as used in vehicles of this class were refined in connection with street railway and other work. In the early days, before the perfection of the chassis and the details of the electrical system, the problems were more diverse in their characteristics and far more difficult to solve.

The tire problem was more acute in connection with electrical vehicles, because the weight of the battery mounted up to a considerable figure. In some of the earlier types of trucks it was not uncommon to observe a weight of two tons in the battery alone. Gradual advances in battery construction resulted in a very material reduction in the total weight, and this reduction, in view of improvement wrought in tires, resulted in the elimination of what was long termed "impossibilities" in connection with electrical vehicles. True, there remains what is called the tire problem, but it has been reduced to a commercial basis, in that the electrical automobiles do so much and such good work as to earn excellent returns on the investment, besides settling for tires and the remaining costs.

In the early days of the electrical automobile the facilities for charging the batteries were so crude as to be indescribable. A battery follows very well known, and fixed, chemical laws; it must be manipulated by a man who appreciates the significance of these laws, and every violation of any one of them carries with it a penalty. There was a time when experts in this line worked continuously with the idea of evolving types of battery, less in point of weight on the one hand, and of greater stability on the other. In the long run reliance was placed on the batteries as they are today, and when it was found that relief was to come by way of more careful attention to details, rather than through the good office of some revolutionary invention, things looked up a bit and the batteries thrived.

Carrying Capacity of Electrical Vehicles

As a general proposition an electrical automobile will carry the equal of its own weight. The motor equipment is of such a character as to deliver the requisite torque under the most severe conditions of service. An electrical delivery automobile, then, will make headway on bad roads, up steep grades and in deep snow. They are not vehicles for speed, and while they are relatively slow, they are sure. Because of this reliability, electrical vehicles lend themselves to commercial work, especially to heavy short hauls, and if they are used continuously, as they should be, the batteries will serve best and earn for the owner of the car in every case the price of a new battery, plus a fair return, ere the battery wears out.

Electrical Pleasure Automobiles

There is nothing that looks more pleasing than a little "piano box" type of electrical runabout, picking its way through busy streets or on boulevards with a lady at the lever. These little cars are perfectly simple to manage; they obtain a speed of

from 12 to 18 miles an hour and they rarely ever get out of order if the batteries are managed by persons of fair skill. These cars can be handled by almost any one at all and in connection with other automobiles in a well-equipped private garage they are extremely useful. There are other types of electrical automobiles that are well worth mentioning as, for illustration, town cars as broughams, victorias, landauets and a type of cabriolet.

In the Service of a Busy Practitioner

Medical doctors, in their practice, especially in the winter time, particularly appreciate comfortable and sure means of transportation. The first year that the brougham type of electrical automobile was introduced in the City of New York seventy-two doctors adopted this type of car for use in their service. Some of them complained that the cost was rather high, but none of them made complaint because their radius of travel was increased and their zone of activity brought them better returns. In the long run they tired of complaining, but they stuck to the brougham and, from all accounts, the quality of the service was improved from year to year until today it represents much of all there is of sturdy, reliable service and comfort in the extreme without defeating stability.

Wide Range of Uses Outside of Professional Zone

In private service the electric vehicle may be in divers forms. From the little car with the "piano-box" body to the most luxurious type of town car is a long way, and space forbids a detailed discussion. Moreover, the subject is well threshed out. Even so, it may not be far fetched to say a word or two by way of calling attention to the fact that in various ways consistent with the well-known abilities of the "electric" the service has been on the increase to a very great extent. From early morning to late at night the cars of this class can remain in constant service, beginning with the safe and comfortable delivery of the master of the house to his office in the morning, by which time madam will command the attention of the car for a shopping expedition. In the afternoon the same car will be available for calls or a roll on the "boulevard," unless it is that some special function intervenes. In the opera season the car will be in much demand, in which service it has long riveted the attention of autoists. The time was when the service that a battery would render did not permit of a schedule such as this. That time is past; the batteries now embody the requisite qualities, which was very adequately proven recently, when a car of this class made a touring trip from Colorado to New York, under its own power, over roads such as were long looked upon as entangling propositions for even pretentious touring cars.

Facilities for Charging

In the early days the question of charging the batteries was so formidable as to retard progress. This phase of the subject made enormous strides until today batteries can be charged in garages in every hamlet in the land and in dozens of stations in the large centers. These battery charging stations are beehives of industry.

So named because GUARANTEED to run 100 miles or more to the single charge.

100-MILE

Will run 100 miles or more over country roads or city streets to the single charge.

FRITCHLE ELECTRIC



FRITCHLE ELECTRIC NEAR JOHNSTOWN, PA., ON WAY TO NEW YORK

No other Electric Car in the world will do as much as the 100-mile FRITCHLE ELECTRIC

If you are going to buy an electric car why not select one that will do *more* than you ask of it—even if the requirements include an overland trip from Lincoln to New York—winter mud, hills and mountains thrown in?

Imagine the perfect service of such a car on boulevards and city streets—when it thus shows its ability to cope with roads as shown above.

This Lincoln-to-New York tour is the contest into which we challenged all other electric car manufacturers to join, but for reasons best known to them not one elected to compete with the 100-mile Fritchle Electric.

We are now closing 1909 Agencies. Write for our Proposition. The FRITCHLE AUTOMOBILE & BATTERY CO. 1449-1455 CLARKSON STREET, DENVER, COLORADO



THE FRITCHLE CLIMBING THE ALLEGHENIES



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Complete line includes all styles
Write for Art Catalogue



AN ELECTRIC SENSATION

The Model R. Baker Electric Runabout that will be exhibited for the first time at the New York Automobile Show, Madison Square Garden—January 16-23, has created a sensation among builders of electric vehicles. A Runabout especially designed for professional and business men—this new model—swift and easy of control in congested streets, opens a new era in electric vehicle construction.

The mileage of the Baker Runabout—at the speed at which this car runs—is phenomenal. It is the most efficient car ever turned out by the Baker Factory—the Greatest Factory in the World Devoted Exclusively to the Manufacture of Electric Vehicles.

Its mileage is 30% to 50% greater than any other electric made and many owners do not charge the Baker Runabout until they have negotiated at least 100 miles.

The Most Remarkable Car Exhibited at the New York Automobile Show

Do not fail to make a memorandum to see the Baker Runabout when at the New York Show. The fact that we cannot manufacture these cars fast enough to supply the demand is the best evidence that this new model has demonstrated its superiority over every other type of gasoline or electric runabout. Strong words—but, Facts are Facts.

We Want Reliable Agencies

In cities where we have no agencies at present. Our aggressive campaign for 1909 will make the Baker Agency very desirable. Write today for our "Special Agency Proposition."

Baker Electrics don't get "tired" or need a "rest" in a garage. They are 100 per cent efficiency. Our "trouble man" is on a vacation. The "Times-Tested" Baker is unequalled.

Our catalogue, describing our complete line of Baker Electric Coupes, Runabouts, Victorias, Landaulets, Broughams, Surreys and Commercial Vehicles, will be sent you on request.

BAKER MOTOR VEHICLE CO.

30 W. 80th Street, CLEVELAND, OHIO.

The Largest Exclusive Electric Automobile Manufacturers.
CHICAGO SALESROOM, 1714 Michigan Avenue



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Perfect in every department—as cozy and luxurious as any woman would have it—as able and efficient as any man would demand it to be.

Nothing is skimped in this car. It is by far the handsomest coupe on the market today.

Write for our catalog describing mechanical features that will at once convince you that it's the soundest and strongest car of its kind in America. See our exhibits at the New York and Chicago Shows. See if you know of a car half so good. Any of the following agents will be pleased to demonstrate.

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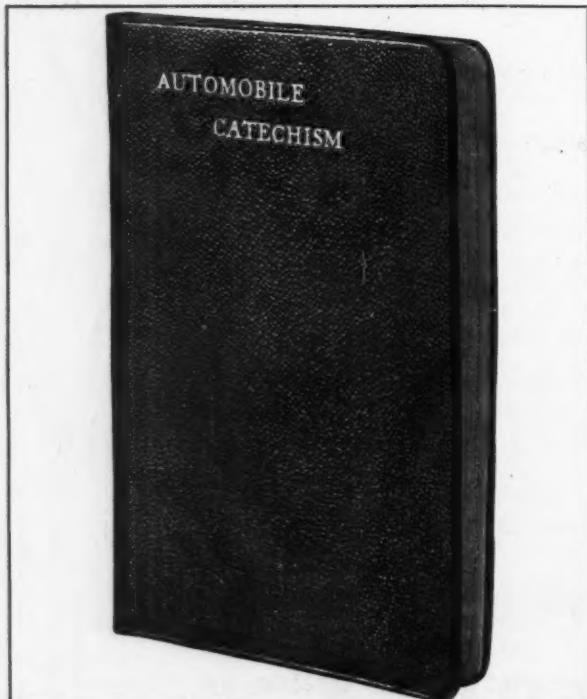
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MARIETTA, OHIO—H. B. Coen, 25 St. Clair Building.
SPRINGFIELD, ILL.—R. Haas Elec. Co., 300 E. Monroe St.
ATLANTA, GA.—M. Rich.
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Size 4½ by 7 inches Pages, 134 With Drawings

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This is the most practical, up-to-date work on the subject in the English language. It is published in pocketbook form, with high-grade leather cover, and printed on especially tough paper, as it is intended to be the inseparable companion of the autoist when on tour. Not a line is wasted on obsolete constructions or descriptions of unfamiliar apparatus. It treats of the automobile in modern form and of all the troubles that may arise in the course of ordinary use and that may be remedied by the driver himself. It is written in plain language and is the most helpful, authoritative, and comprehensive manual that has yet appeared. The subject matter is in the form of question and answer, and an exhaustive cross index makes immediate reference possible in any particular case.

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Talk About Endurance!

HERE'S an actual picture of actual road conditions encountered by the Detroit Electric on its run from Detroit to Atlantic City, a distance of 1060 miles.

The car that made this trip was not especially prepared for it.

Its equipment was identical in every particular with the cars we supply Detroit Electric purchasers.

The batteries were standard batteries, and the tires were standard six-ply tires.

This car carried two passengers and about 150 pounds of baggage including extra casings, etc.

It arrived at its destination without a broken part and without once having been assisted along the way.

No other electric car ever before made such an overland trip—no other electric car ever before overcame such tremendous difficulties. This wonderful run demonstrates beyond any possible gainsay that the Detroit Electric is the peer of them all.

Write for Interesting Booklet

We have had a full account of this trip written up, in a very interesting booklet. It is illustrated throughout from photographs made along the route. This booklet will give you an idea of the nature of the trip made by the Detroit Electric, and the difficulties encountered—please write for it. We will gladly mail it to you with our compliments. We will also send you our handsome brochure showing seven different styles of Detroit Electrics for use everywhere, and prices. Address

140 Miles
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Meet us at New York Jan. 16-23; Chicago, Feb'y 6-13

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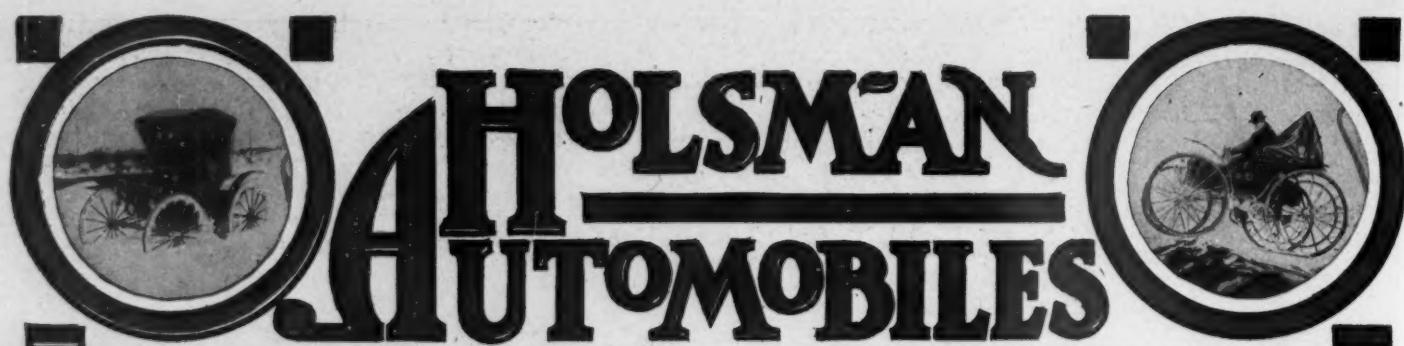
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Buggy-type Section



INCLUDING
The Several Examples of High Wheel Automobiles.



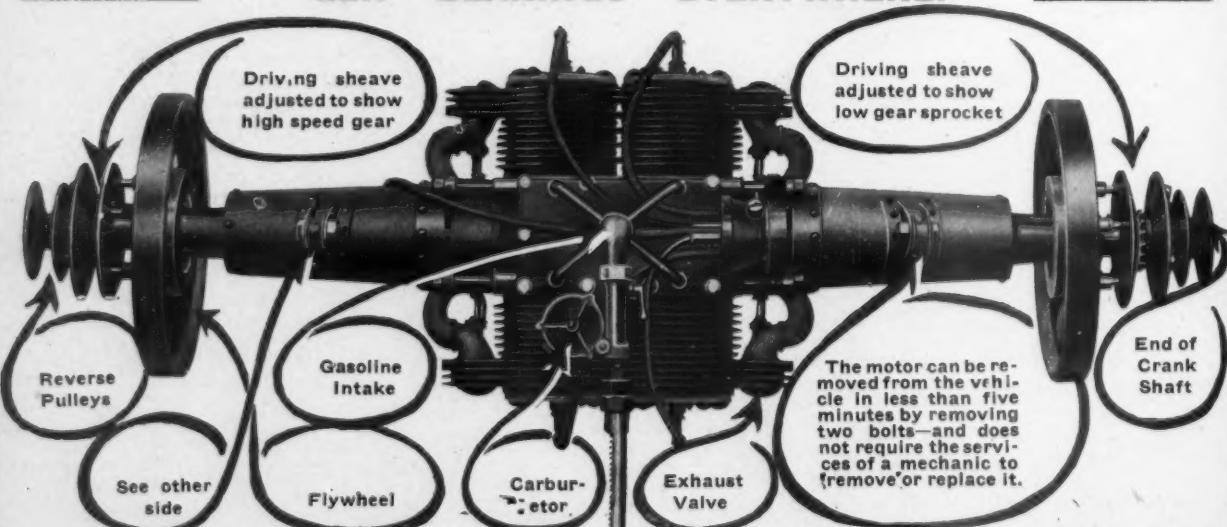
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THE GREAT COMMERCIAL WAGON



We will Exhibit at the New York Show, Grand Central Palace, December 31, to January 7, and the Chicago Show, Coliseum, February 4 to 13.

THE MOST REMARKABLE MOTOR IN THE WORLD. BALL AND ROLLER BEARINGS EVERYWHERE.

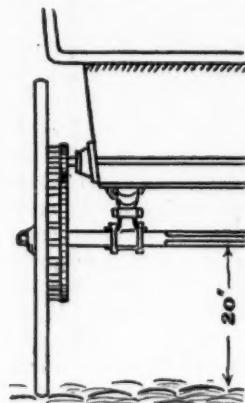


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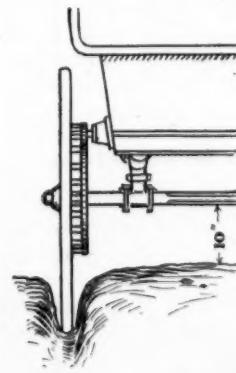
HOLSMAN AUTOMOBILE CO., CHICAGO, ILL.
SUITE 360 MONADNOCK BLOCK.



EARLIER examples of automobiles were, in point of general appearance, close in point of resemblance to animal-drawn vehicles of every kind. In the evolution of the car the pneumatic tires were found to be very desirable (having been tried out in bicycles), but the cost was found to be so very great as to debar the use of pneumatic tires with wheels of such diameter as were found on animal-drawn vehicles. Result: the diameter of the wheels was reduced to a point low enough to bring the cost of pneumatic tires to a commercial basis.



NO LACK OF GROUND CLEARANCE

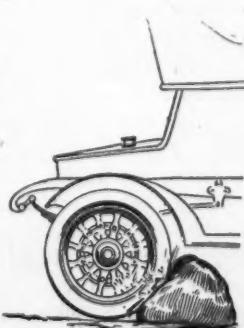


MAKES WAY IN THE MUD

developed types of vehicles peculiarly suited to roads in which, if there was a bottom, nothing ever seemed to reach it.

The advocates of the high-wheeled type of car were well experienced in relation to the road conditions, and they kept uppermost in mind the features of construction along lines consistent with the requirements. They could not well improve upon the general features of the conventional buggy, and they were wise in that they did not bow to the clamor of the "pack," who would be most pleased if the automobile were to resemble an "Atlantic" type of locomotive.

While it is true that the high wheel,

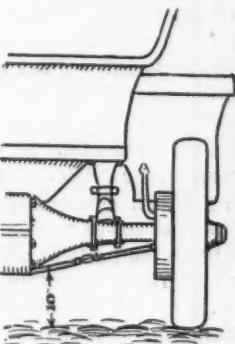


with a view to increased ground clearance and with a certain symmetry of shape, renders it possible to negotiate bad roads, it is equally true that the long spokes render the wheels pronouncedly resilient, and were we to put this by way of a law, we would say that the desirable properties of the spokes would be proportional to the cube of their lengths. This is equal to saying that a high wheel with long spokes has many, if not all, of the properties of a pneumatic tire. If pneumatic tires are used on wheels of less diameter, it is because the wheels have not the requisite properties, and they must use a pneumatic tire; whereas, with the high-wheel types of cars the resiliency that resides in the wheels renders it unnecessary, to a large degree, to add further resiliency by way of pneumatic tires.

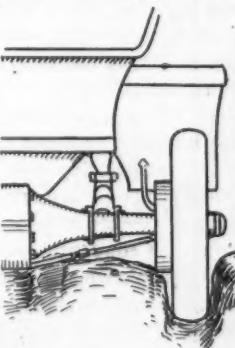
There was a certain definite limit to this reason, but the high-wheel types of cars are confined within that limit, and their utility is by no means reduced to that involving country roads in bad condition. These cars do excellent work on other than bad roads; indeed, it seems almost unnecessary to point out that if they will serve on bad roads, there is nothing to prevent them from excelling if the road conditions are improved. There is a certain economy from the point of view of maintenance in taking advantage of the resiliency of the high wheel to the exclusion of costly pneumatic tires, and it is a fortunate circumstance that the solid tires work better with a limited section than they would on a more extended basis.

Utility is the first consideration, and there is utility in the automobile on good roads, or the high-wheeled mechanical car on the roads not available for the standard types of automobiles. A thing is good if it looks good, and an automobile stuck in the mud does not look good, nor is it good. On the other hand, a high-wheeled type of car wading through that very mud does look good, and it is good. The incentive, then, is there; the car has its utility; it is cheap to build, because there is not so very much of it, and the builders of such cars are in a position to take advantage of the years of experience of the carriage makers.

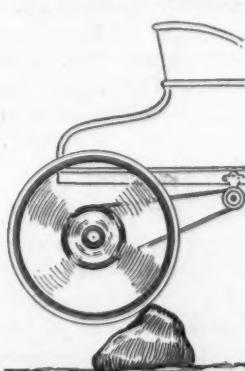
It is not to be supposed that the high-wheeled type of car will lend itself to enormous speed, nor can there be any good reason for wanting to go at racing speeds in cars that are designed to make reasonable headway on country roads. These cars are provided with 18 to 20 horsepower, as a general proposition, so that it cannot be said of them that they are inade-



USUAL CLEARANCE OF A RUNABOUT



LACKS ADEQUATE GROUND CLEARANCE



MOUNTING OBSTRUCTION

quately provided with means of locomotion. Instead of being geared for high speed, they are geared to negotiate bad roads, which is a matter of considerable power and a high gear ratio. Even so, the average buggy-about will make 20 miles per hour on good roads, and under pressure it may do considerably better. This speed, in comparison with numerous runabouts of the past, compares very favorably, indeed, and for a doctor (for illustration) it is so much faster than anything possible with horses that the doctor will be justified in taking to the high-wheeler for good and all.

The Question of Tires

It was pointed out how the automobile of the conventional type came to wheels of a small diameter (a matter of dollars). The high-wheel type of car became possible with the introduction of solid tires (rubber), the cost of which was not so great as to limit the diameter of the wheels below the diameters customary with carriages. There are one or two points in relation to this phase of the question that will bear discussion, as, for illustration, the tires used on the high-wheeled types of cars are of quite small section, and it is possible that many critics will labor under the impression that this is a matter of dollars, too. But it is not. When solid tires are used they should be of the smallest possible section consistent with the fact that they will flatten out and elongate if the stresses exceed the ability of the rubber to sustain. If, on the other hand, the tires are of liberal section, the rubber will not be sufficiently stressed, and a bouncing effect, most disagreeable in its action, will be the result. When it comes to solid tires, then, the smallest possible section will be the best for use, because the car will stay on the ground, and perform smoothly within the limits bounded by its legitimate sphere of influence. There is just this difference (fundamentally) between the pneumatic tires on the one hand and the solid tires on the other: The pneumatic tires should be as large as possible, and the solid tires should be the reverse.

The Transmission System

* Whatever the difficulties are when it comes to gearing a gasoline motor at a high speed to the rear wheels of an automobile, the latter at a lower speed, these difficulties are much accentuated in connection with the high-wheel type of car, because of the fact that the wheel is of great diameter and one revolution of the wheel means a considerably greater distance on the road than will obtain from one revolution of an automobile wheel, the latter of comparatively small diameter.

In transmitting the power of the motor, involving the high-wheel type of car, devices have been taken advantage of that may not have looked quite so mysterious as are the devices in connection with conventional automobiles. There are, perhaps, a great many people who may have labored under the impression that the transmission devices to be seen on the buggy-about are merely so designed to avoid cost. They can disabuse themselves of the idea, and were they in the position of the designer of the high-wheeled type of car, they would be subject to the same stress of circumstances, and they would have to bow to the same existing conditions. The difficulties are extreme, and the wonder is that the details of the transmission were so nicely worked out in so short a time, and that they worked out so well. While in some isolated instances the details of the transmission are in process of evolution, with strong hopes of evolving means of far more than ordinary merit, the fact remains that the industry on the whole is crystallized, and the patrons who require high-wheeled vehicles were well considered during the process of designing.

Body Work as It Relates to High Wheel Types

The experience of a century of carriage building is worth something and that the result of this experience still clings to the cars of the subject is to be expected. Naturally there were influences to be considered such as would bring the cars up to date and to the requisite extent allow for the presence of machinery. That the machinery naturally would have to be taken into account is not to be lightly thrust aside, but it was a process that did not result in destroying the fine points in bodymaking

as they relate to the buggy type of automobile. In the high-wheel types it is necessary to have strength, but it is also important to eliminate weight. Indeed, if it is important to keep the weight down in automobiles in general, it is of far greater importance to depress the weight in this type.

Experience has taught the builders of this type of cars how to retain strength and at the same time avoid weight, which condition is contrary to the general expectation, from the point of view of the design of structures. In general it is the custom to expect weight if great strength is to be a factor. Under these conditions it will be a mistake to assume that the buggy body is used because it is low priced or for any other commercial reason, not taking into account the consideration involving appropriateness as the first requisite. In this service the several types of bodies are used just as in the automobile in general, in which room is afforded for from two to seven passengers, and space is included for the storage of tools or whatnot.

Some General Considerations

Simplicity in a high-wheel car should be as natural as a duck in a mill pond. This same simplicity augurs for the entire absence of every possible device for whatever purpose that will not defeat the operation of the car. In this field the air-cooled motor makes it possible to eliminate the radiator, the water pump, and the piping. But if a water-cooled motor is preferred, then the thermo-syphon system of water circulation (the natural water system) renders unnecessary the use of a water circulating pump and such complication as will result from its use. When it comes to the ignition system, it is highly improbable that a magneto will be necessary, because the motors used are adequate in point of power, without having to squeeze the last drop out of them. It is even possible that an ordinary kick-coil would well serve the purpose, and by its use do away with the vibrator, which does seem to trouble a great many people with periodic frequency. If the ordinary kick-coil (known in modern and more elegant language as a step-up transformer) will serve on cars of some pretense, costing vastly more than the high-wheel type of cars, it is not too much to say they will prove decidedly advantageous on the cars in which extreme simplicity is worth paying extra for. The trend is in the direction of this extreme simplicity and the builders of these cars are staying awake o' nights inventing simplicity instead of complications.

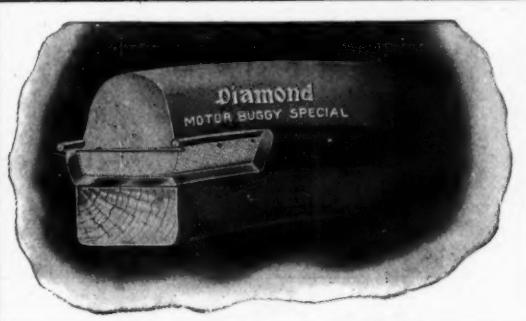
Taking Into Account the Cost of Maintenance

The first cost of the high-wheel car is low. Interest on the investment is low. Repair parts can be had at low cost. The tire situation is healthy. The utility of the car is assured. These five statements are as a word picture that tells the whole tale to the man who may have had anything to do with the subject at all. It is nothing short of utility that demands just what the high-wheel car affords. It is all very well to own and run a pleasure car of the conventional type under pleasurable conditions, but it is not all right to try to do the work of a buggy type with anything else but a buggy. Cost must be taken into account in the long run, and there are a horde of users of cars at the present time who find in the buggy type the very car they require. This is a fortunate circumstance, in which the low cost of the buggy type, coupled with its naturally low cost of upkeep, are fitting factors.

From the fuel point of view the buggy type has always stood out as all that can possibly be desired by conservative man. In spite of this fact the available power is adequate, in which the power for weight is at least up to general practice. In hill climbing the buggy type has done so well that it surprised the average autoist, who, in his egotistical way, failed to keep abreast of the times. He failed to note, for illustration, that the first automobile in which the motor is arranged to deliver power direct to the rear road wheels is of the very type he was so prone to despise. He failed to take into account the fact that the reason his wheels were not high was because he had not the inclination to pay the price to procure them.

Diamond Motor Buggy Special

Made Especially for High Wheel Automobiles



For two years these tires have had a wide lead in this field.

The same reasons that have made **Diamond Wrapped Tread Pneumatic Motor Tires** the equipment of more automobiles than

any other two makes of tires combined, have put our motor buggy special in a similar position in the high wheel field.

RESULTS To Consumer

RESULTS To Dealer

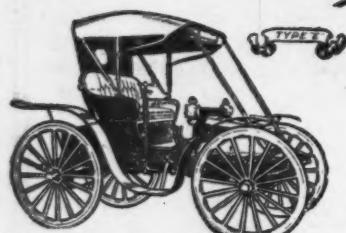
RESULTS To Manufacturer

Note these prominent manufacturers who are regularly using Diamond motor Buggy Special Tires

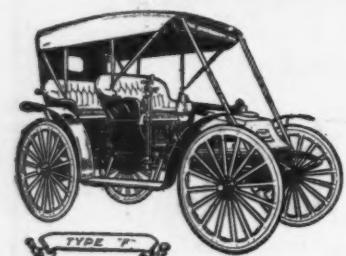
Burns Bros., Havre De Grace, Md.
Chas. E. Duryea, Reading, Pa.
The Buggy Car Co., Cincinnati, O.
Schacht Mfg. Co., Cincinnati, O.
Brush Runabout Co., Detroit, Mich.
J. V. Lindsley & Co., Dowagiac, Mich.
Fuller Buggy Co., Jackson, Mich.
Anderson Carriage Co., Anderson, Ind.
The Butler Co., Butler, Ind.
Fehring Carriage Co., Columbus, Ind.
The Bendix Co., Chicago, Ill.

Holsman Automobile Co., Chicago, Ill.
International Harvester Co., Chicago, Ill.
Reliable Dayton Motor Car Co., Chicago, Ill.
Lincoln Motor Vehicle Co., Lincoln, Ill.
Chris Heckenauer, Muncie, Ind.
Safety Shreder Co., New Castle, Ind.
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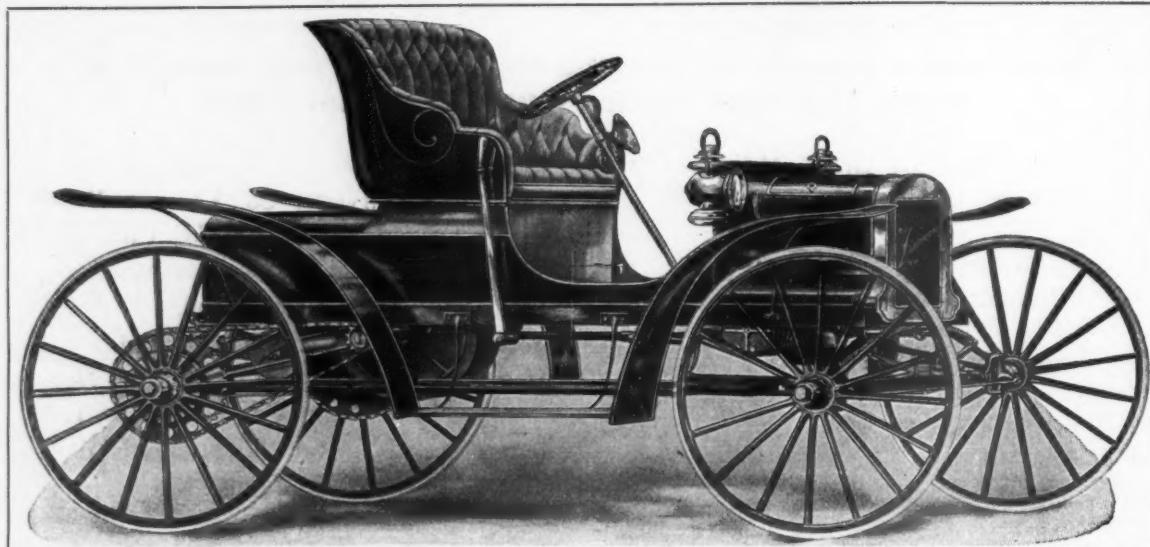
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"It is all very well to own and run a pleasure car of the conventional type under pleasurable conditions, but it is not all right to try to do the work of a buggy type with anything else

but a buggy. Cost must be taken into account in the long run, and there are a horde of users of cars at the present time who find in the buggy type the very car they require. This is a fortunate circumstance, in which the low cost of the buggy type, coupled with its naturally low cost of upkeep, are fitting factors.

"From the fuel point of view the buggy type has always stood out as all that can possibly be desired by conservative man. In spite of this fact the available power is adequate, in which the power for weight is at least up to general practice. In hill-climbing the buggy type has done so well that it surprised the average autoist, etc., etc."

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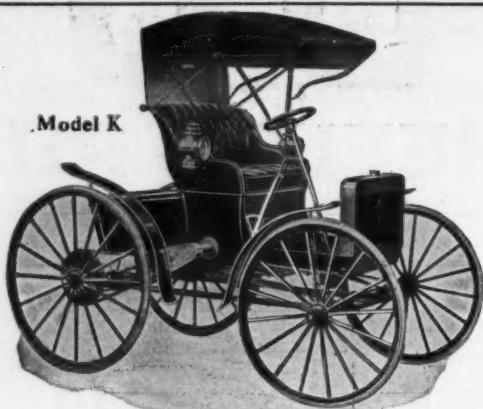
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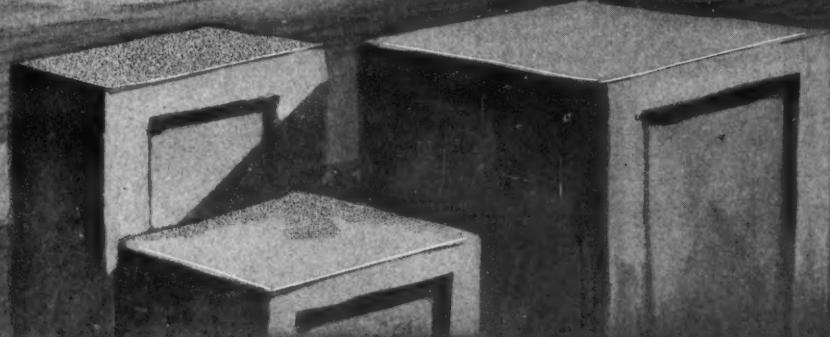
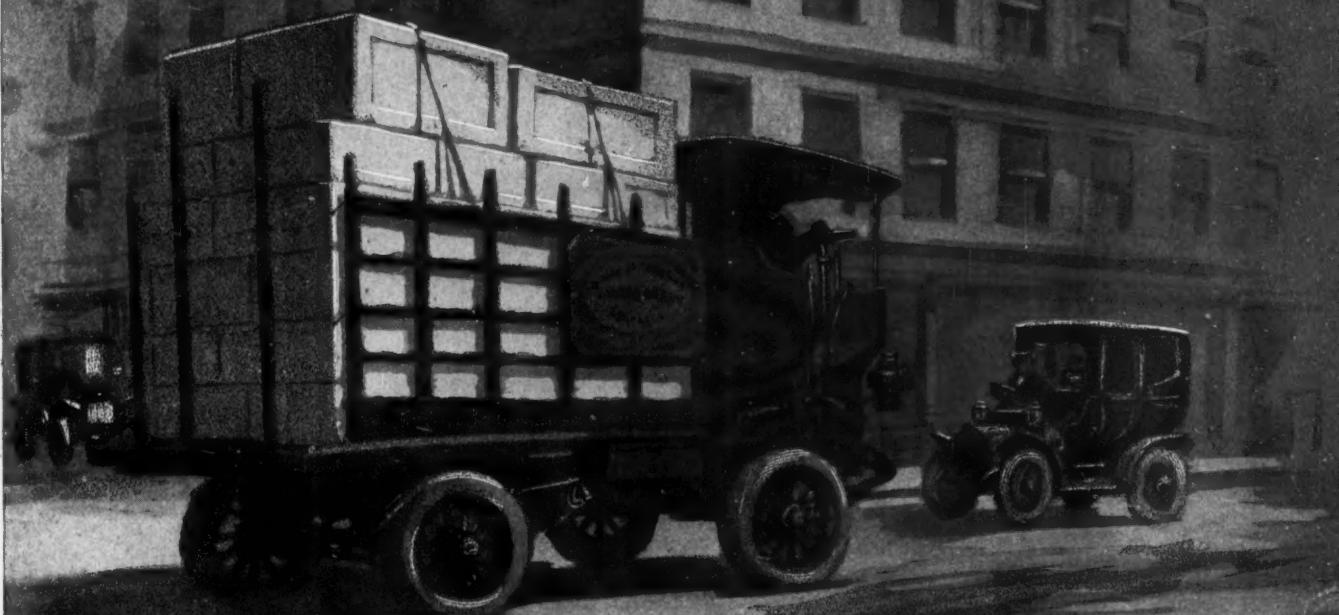
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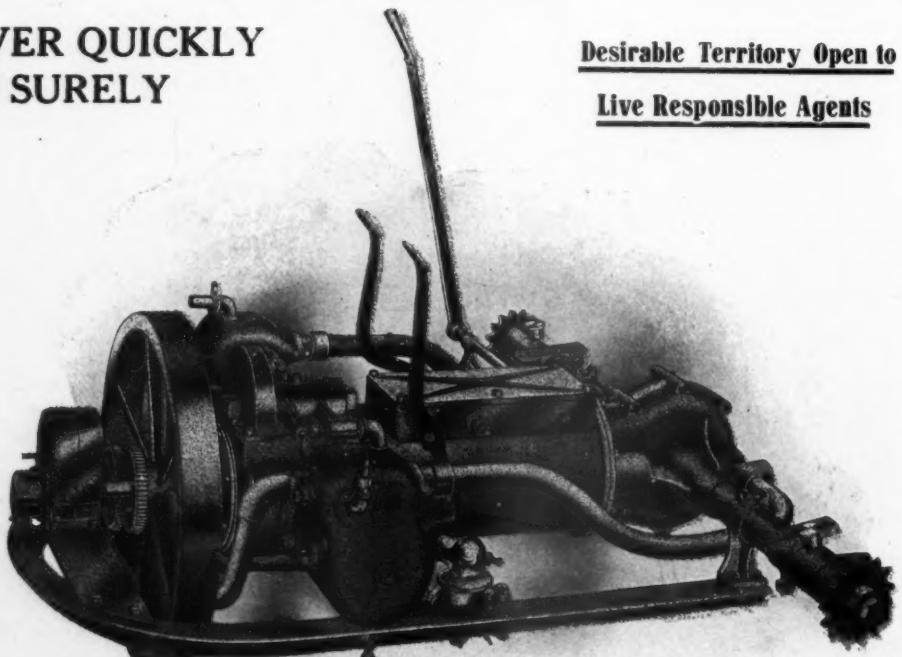
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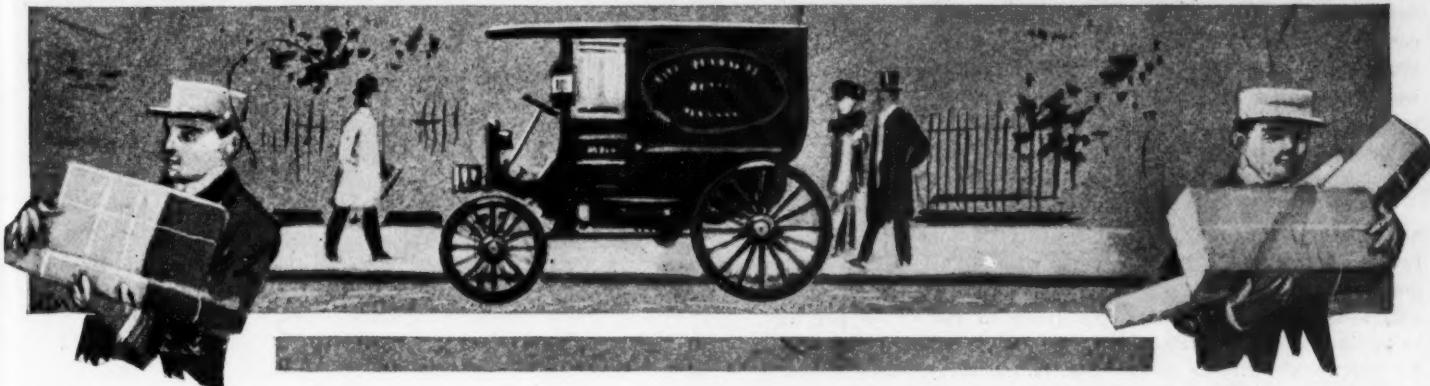
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The Automobile in Commercial Work



PLEASURE, then profit, seems to be the logic of the autoist. At all events, the pleasure types of automobiles were perfected first, and the commercial types were the product of necessity. The automobile as a mode of motion and a means of transportation can no longer be denied its place at the head of the line, nor will it be subdued in its onward march until it stands in the light of "lock, stock, and barrel."

Of the commercial automobiles there are steam, electric and gasoline, named in the order of their coming.

Steam is widely the underlying principle in tractors and heavy trucks, with a growing tendency in the direction of the lighter trucks and delivery wagons.

The electrical automobile long dominated a certain zone, which, for brevity, can be set down as the "short haul" of the electrical commercial, they range from heavy trucks down to light delivery wagons.

The gasoline commercial was slow in coming, but from appearances it will persist in staying. The gasoline automobile may now be seen in divers forms as trucks, tractors and deliveries. There seems to be no limit as to capacity, nor is the nature of the merchandise to be transported, of necessity, taken into account.

The trend is away from the old practice of trying to impress a touring car chassis into commercial work, and account is now taken of the conditions that surround the work to be done rather than to placate the forces of the shop in which the automobile may be constructed.

It would be very nice, were it possible, to make one chassis serve in all zones of activity. It is very discouraging to try and fail. In all cases thus far failure (certainly not success) has attended the effort.

This fact probably had more to do with the retarded use of the commercial automobile than any other dozen of conditions. The labor problem and the personal equation generally is even now a retarding factor; much improved, however, partially because the automobile has been simplified, and, again, due to the education of men generally in the ways of the automobile. The especially devised commercial automobiles of the present time are so perfectly simple and devoid of delicate parts as to assure freedom from harrassing and costly interruptions, if only the operators will confine their attentions to the simple process involved in running the cars. The screwdriver, the monkey-wrench and the squirt-can may be left in the garage, and the cars will serve well their respective purposes if they are not tinkered with.

The commercial automobile situation, as it may be regarded at the present time, includes the divisions as follows:

- (1) taxicab;
- (2) heavy trucking;
- (3) suburban express;
- (4) general delivery work;
- (5) utility-pleasure automobiles.

In addition to the sub-divisions above set forth there are divers uses to which the automobile may be put to that will not be elaborated upon here, since the cars do not have to be especially devised for the purposes. In other words, within certain limits, a given model can be used for several commercial purposes, and serve well.

Characteristics of Taxicabs

In a general way, taxicabs differ but slightly from town cars. The town car in private service is maintained on a little higher plane as respects appearance than the taxicab in public service. The underlying mechanical features would be common in the two types of cars. The body work would be a little more stylish and a little less stable in the town car proposition, whereas the taxicab service body should be of neat design, but of great stability. The taxicabs promising most at the present time are of moderate power, short radius of turning action, and easy on tires, which is brought about by way of the elimination of unnecessary weight, good spring action, and a harmonious relation of the parts.

Taxicabs are especially economical in the use of gasoline, and, with the customary supply of this fuel, they have a wide radius of action. The cost of maintenance on the whole is extremely low, and the operator is not expected to be able to make any repairs at all. It is but rarely that taxicabs become disabled in the street (accidents excepted), and it is better, in view of this fact, to do without the class of labor that would turn every side street into a repair shop. There is nothing that would retard the patronage of taxicabs so much as the spectacle in its disagreeable aspect represented by a man of no great skill tinkering with a taxicab that refuses to run.

Growing Field of Heavy Trucking

"The seventeen mule team" hitched to a "prairie schooner" is the best illustration of the stupidity of man that can be found in any land. It is slowly percolating through the centers of intelligence of those who require goods to be transported that the automobile truck is here, and is available for use for every purpose of goods transportation without any limit whatsoever and on a basis of decreased cost per ton mile of the goods transported. If the automobile truck has appeared to be backward in connection with the work in question, it has been through lack of appreciation on the part of merchants rather than lack of ability of the trucks. These outside retarding influences were unfortunate, in that they made it impossible to acquire a full measure of experience, and on this account improvements seen today at every hand may be regarded as tardy.

In this zone of activity honors are pretty evenly divided, although in the past the extremely heavy work was done by the "steam lorry," while the average commercial undertakings were partial to electrical trucks. Gasoline trucks did not come into vogue to any great extent until very recently, mostly because the builders of gasoline cars had about all they could

handle in pleasure work. A few of the companies handled the commercial situation as a side line, merely converting their chassis into light trucks and delivery wagons. This was more a misfortune than anything else, due to the great difference as between pleasure cars and cars required in the transportation of commercial lines. The gear ratio in such cases would scarcely lend itself, and many failures were directly traceable to the use of sprocket wheels with as few as eight teeth. A given motor cannot drive a car as fast as possible and haul a load as big as possible at the same time.

The High Speed Transportation of Goods

If the heavy trucks are confined to a certain class of work at a low speed, the modern delivery automobiles make up for any loss of time in connection with suburban express and general delivery work. A single delivery wagon, as they are designed today, will make from three to four trips per day, as against one trip with a span of horses. The automobile will do this work "rain or shine" and in the extremes of temperature. These special cars are provided with a commodious platform, are no more limited in load capacity than any other vehicle, and will make as high as 20 miles per hour, as against a quarter of this speed with horses. The same men who formerly handled the horse-drawn delivery wagons can be, and are, used in automobile service. The labor item is reduced to about one-fifth of that in connection with horse-drawn vehicles, while the advantage of quick deliveries by way of satisfied customers too difficult to estimate, and is rarely ever adequately taken into account.

There are advocates of the automobile delivery wagon who are firm believers in the future of the automobile to the extent that it will displace every other means of transportation in local hauls. Anyone who will take the trouble to trace the ramifications through which a small package will have to go in transit from a store in a city to a purchaser in a suburb, not 20 miles away, will quickly reach the conclusion that a single handling and a direct automobile transport is inherently economical. It is the inherent economy that will obtain in the long run, retarded only for a time because of the compactness of commercial organizations so busy conducting a complicated system that they have no time to recognize the merits of a direct method.

Utility-Pleasure Automobiles

Merchants in a small way are fast becoming used to the idea of displacing the single (horse) delivery wagons in favor of automobiles, so designed as to serve in delivery work during the week, to be converted into pleasure autos on Sundays and holidays. This very large field is being exploited by small cars of considerable merit. The cost of this service, under suitable conditions, compares favorably with the cost in the old way. Runabout types of automobiles with suitable body modifications serve well the purpose, especially in the cases in which tires are afforded a reasonable measure of intelligent attention.

High Wheel Types of Delivery Wagons—In this connection it may be well to mention the advances now being made in high-wheel cars in which it appears, some of them at any rate, are finding their way into commercial work, especially for use in the grocery trade and in the service of small merchants generally. This class of cars are of low cost, simple to operate, and they can be converted into pleasure vehicles at will at a moment's notice. In the towns and villages throughout the land the roads are not so good as to be easily negotiated by cars with a low clearance, especially in the winter time, if there is much snow on the ground. The buggy type seems to serve well the purpose under such conditions, which is a guarantee in itself that the same type is not limited, since if it will do under adverse conditions there is nothing to prevent its working under favorable circumstances. In whatever service the type will serve, it is bound to impress itself, primarily because the first cost is low and in view of the ease with which it can be converted. The simplicity of the type is an assurance that the users will be able to master the same even though skill may be at a low level from the mechanical point of view.

On the whole, the experimental side of the commercial situation passed off smoothly, and the absolute failures were few and far between. They consisted, for the most part, in ventures of a most shady sort, ventures in fact that could only end in losses, as almost anyone of reasonable knowledge of the industry might have predicted. Inventing to fill a long-felt want, which is a practice not uncommon, is always attended with dangers, and it was mostly along such lines that the industry stubbed its toe, so to speak. As the automobile accumulated stability, which was a matter of going slow enough to imbibe of experience, the commercial situation expanded, and today there is no chance of failure, nor can it be said that much less than signal success will attend efforts to utilize commercial automobiles in every single instance in which merchants have goods enough to transport to an extent that would keep a hand-cart overburdened.

The old idea of using the automobile as an advertisement is a dead issue. There are now too many of them in use to enable any user to "stand out" as more enterprising than a hundred dozen of his equally prosperous competitors. Today the commercial automobile is used because it will do more work, and more prompt work, than can be done in any other way. By more prompt work, it is to say, the given quantity of merchandise can be moved in less time. A canal boat will serve to transport goods by wholesale, only time is taken in the process. A railroad will transport the same bulk in far less time. It only pays to use the canal if time is no object. In a big store time is money, because the rent and the other charges are enormous, and they go on, measured only by the tick of the clock. With a canal boat, if the goods are not in immediate need, they are purchased on a low market, and the time taken in their transportation is an advantage, since storage charges will not have to be paid in the meantime. The low freight rate, coupled with the "free storage," renders canal methods especially desirable, which, however, represents a mode of procedure that is foreign to the merchant whose customers want the goods they order the day they are ordered.

Comparison of Transportation Cost, Auto vs. Horse

There has been a good deal of discussion in relation to the question of the relative cost of goods transportation, considering animal-drawn vehicles on the one hand and automobiles on the other. Much of the discussion was without good foundation in that the comparisons were not fairly presented. A biased advocate is bound to disregard the side he does not intend to represent, and he is prone to misrepresent the side he espouses. Such presentations are damaging to both sides of a case, and reliance must be placed on the good judgment of those who are the unwilling audience in such instances. In any event, the proof of the pudding is in the eating, as they say, and the merchants who sampled the commercial automobile must have liked the flavor, since the industry has grown and prospered.

Notwithstanding this growth there is still much opposition to overcome, due in no small measure to the presence of "horsemen" in charge of the transportation of goods for merchants. They know all about horses; they like animals; their knowledge of the automobile would be great if they knew as much about them as they do about "spavins." This loyalty to the horse is commendable in the extreme. Loyalty is a virtue. When it fades away, or when merchants put automobiles in the hands of the men who will appreciate their needs and the conditions under which they will render the best service, then, and then only, will the records of costs be worth taking into account.

It will occasion no great alarm, even if these conditions do obtain to quite some extent, for two reasons at least. In the first place, if merchants really knew how thoroughly good automobiles are for the purpose of transporting goods they would not use horses at all, and the change would come so suddenly as to discommod the breeders of horses, and the wagon builders, whose investment would be destroyed. In the second place, the requisite number of skilled men in the automobile industry would be difficult, if not impossible, to provide, and the industry would suffer a setback on that account.

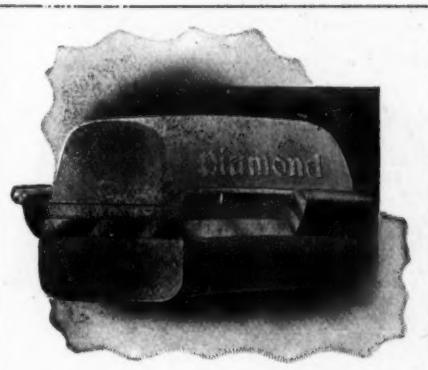


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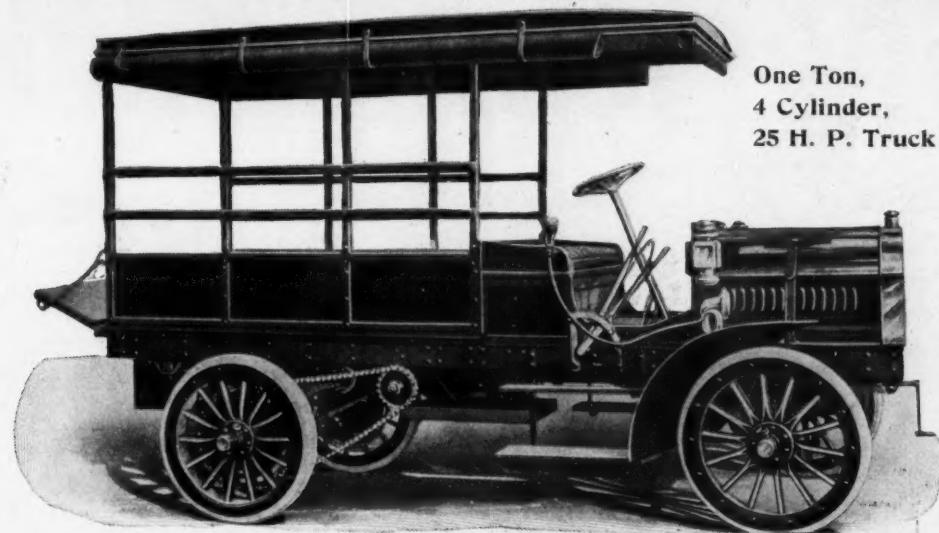
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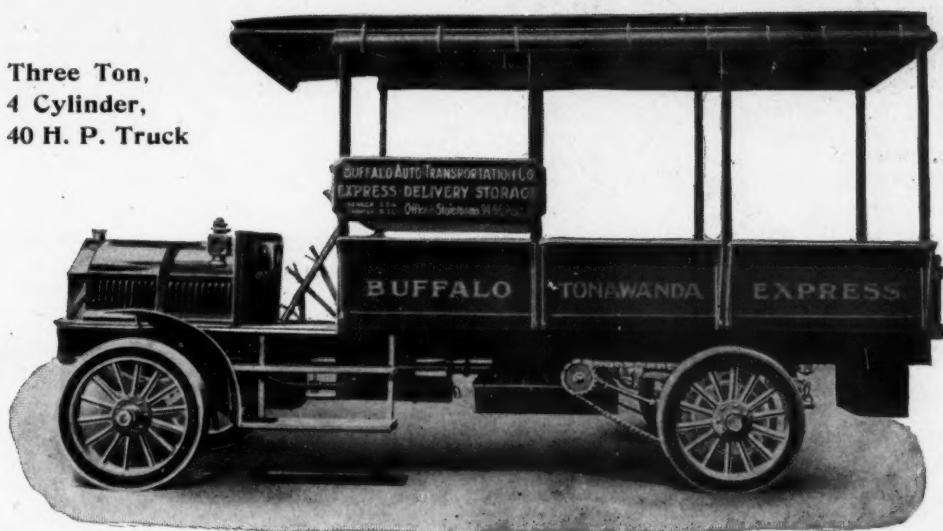
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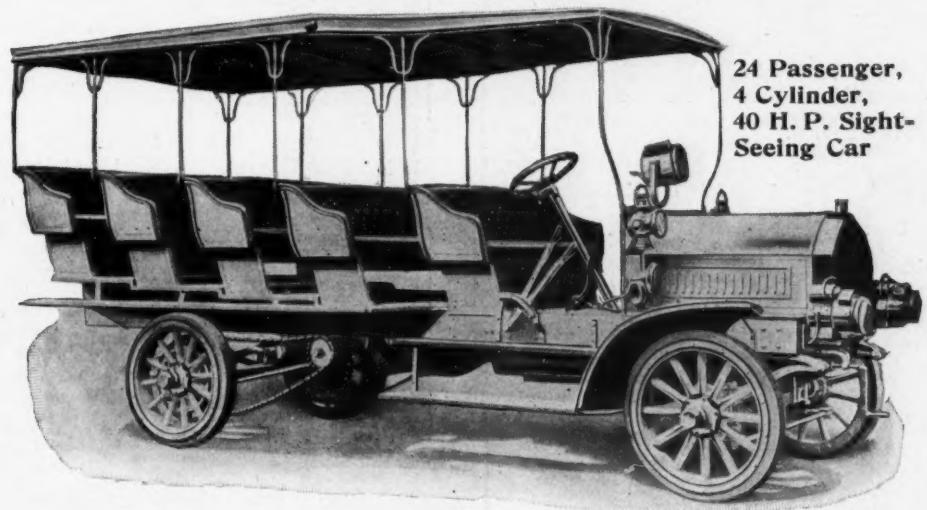
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THE RELIABLE LIGHTWEIGHT

Most Reliable Commercial Cars on Earth.

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The "EWING" car has been designed by a staff of competent engineers under the direction of Mr. L. P. Mooers, with a view to building what the trade of the world has demanded, a thoroughly high class up-to-date Town-car and Taximeter-cab. This has been accomplished by the Cleveland Autocab Company, at Geneva, Ohio.

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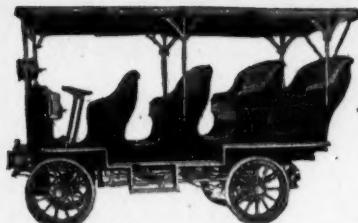
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We want agents—hustling business getters—men with financial backing—not chauffeurs or demonstrators—and to the one in each locality who secures the agency for Rapid Commercial Power Wagons, we will put behind him one of the greatest selling and advertising campaigns ever put behind any commercial power wagon proposition.

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The Rapid Line for 1909

comprises models ranging from 1,000 pounds up to six tons, as follows: Rapid Commercial Power Wagons for *any line of business* in $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, 3, 4, 5 and 6-ton sizes.

Motive power: engines of the two-cylinder opposed 24 to 30-H.P. type, up to four cylinders, 60-H.P., vertical, heavy-duty motors.

The Rapid line for 1909 offers the largest selection of models ever manufactured.

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There are no theories represented in the Nineteen Hundred Nine Rapid Commercial Power Wagons. All mechanical and other details have been proved correct by over ten years of actual service in the hands of hundreds of users in over fifty different lines of business.

We have spent *over a quarter-million dollars* to bring Rapid Commercial Power Wagons up to their present state of perfection and efficiency.

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A word about the Rapid Motor Vehicle Company: It is the largest and oldest in the commercial car business—and makes nothing but Rapid Commercial Power Wagons, which are "**BUILT FOR BUSINESS.**"

The agent who "ties up" to our organization gets backing which means a great deal, not only in influence, but in protection and fair treatment; a factory which can stand back of its product with a guarantee that means just what it says and a factory which helps its agents in every way possible.

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A quick detachable power plant, including engine, transmission and control, that can be detached and replaced in fifteen minutes.

Independent unit construction throughout.

Thermo-syphon cooling system, with emergency condensing chamber, that positively prevents superheating.

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Perfect balance throughout.

Quick detachable, interchangeable body.

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Compensating steering gear that can always be kept tight.

Adjustable glass front and driver's cab on every car.

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is to tell the buyer who makes the thing he wants. The arrangement of our classified lists presents the advertiser's name and announcement to the purchaser just when the latter wants the identical thing advertised. It is constantly referred to by Managers, Mechanical Engineers, Superintendents, Purchasing Agents, the men who specify and buy parts and material for the construction of cars, and by Dealers, Garages, Supply Houses, and the entire trade.

Advertisers are loaned our Complete Mailing List of the trade to enable them to "follow up" their advertising in the Directory. **WRITE US FOR PARTICULARS**

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THE AUTOMOBILE TRADE DIRECTORY

231-241 West 39th Street
NEW YORK



In the automobile it would not be out of place to refer to the frame as a chassis, nor is it a stretch of the imagination to include the accessories of a frame as springs etc., together with the axles and the wheels on which they roll. It seemed far fetching to include the power plant, and so it has been discussed separately, and the wheels, the products of an ancient craft, are excluded from this discussion, as they are entitled to separate consideration.

For the present, confining the discussion to the chassis proper (frame), it may not be out of place to lay stress upon the features of the most importance, but the least discernible. A casual observer from the paint that covers the frame might pronounce the frame as good, if perchance the finish makes it look good. The modern automobile maker has the happy faculty of seeing things as they are, and frames of cars as they abound are no longer of cold pressed, mild Bessemer plates. It is the present practice to use fine grades of steel, the quality of which is fairly represented in the mere statement that it will stand in the cold bending test 180 degrees, and, flattened down, without showing signs of distress under a twenty-to-one glass.

Prevailing Shapes in Frames—The channel section seems to spell finality, but wood has its strong points. Mathematically, this section holds forth the promise requisite to the occasion, and, practically, this same section lends itself readily to the process. Because of the fine materials and the willingness of the channel section to conform to intricate shapes, the drop frame has come into vogue, thereby rendering it possible to lower the center of gravity, besides facilitating entrance and egress of the car. This same readiness to conform to shapes renders it feasible to fashion the lateral members in a manner agreeable to machinery equipment.

The most recent products are to the gradual elimination of castings at any point on the chassis, and in some of the examples it is to note the presence of pressed steel instead of parts by the drop forging process. The object of resorting to the use of pressed steel fittings instead of forgings is with a view to decreasing cost without suffering a diminution of quality. In the abstract steel plates are of greater strength and in better condition than drop forgings. In the process the pressed steel parts would retain their quality, assuming the riveting is given a due measure of attention. That the builders of cars are fully alive to the advantages of the respective methods is a matter that can be easily set-

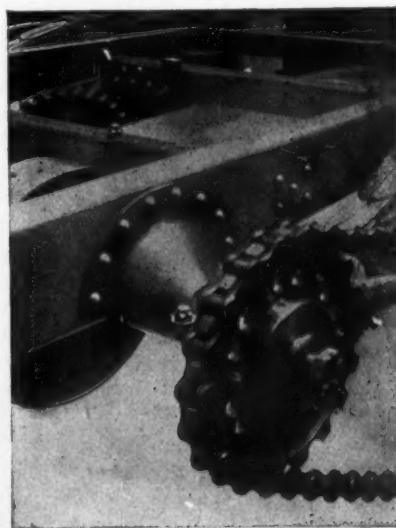
tled by merely glancing at the products. They use drop forgings where they will best serve the purpose, and they resort to the use of pressed steel to a marvelous extent.

Spring Suspension in Automobiles—There is no one detail of such great importance or so difficult to manage as that of evolving easy riding qualities and longevity of the supple members. The quickest way to break a piece of steel is to subject it to alternating deflections in reverse. Springs have to sustain under these conditions, especially springs in automobiles. They have to be worked to a point near the elastic limit to engender easy riding qualities, hence kinetic ability must be the marked characteristic of the steel employed for this purpose. The improvements wrought in spring steel and in the treatment of the same can scarcely be adequately described in a word picture. In the old days steel that would stand up to half a million of vibrations under the stress of half the elastic limit was said to be good enough to place in a safe deposit vault, but the automobile makers of today are making strenuous efforts to exceed one million six hundred thousand vibrations at half the elastic limit. The value stated is extremely high.

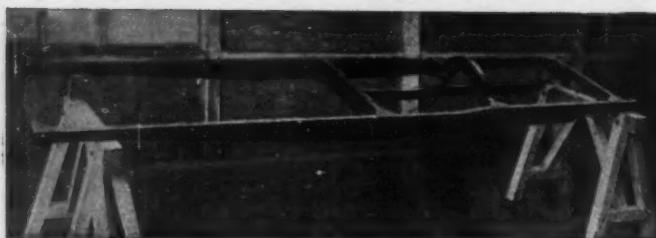
It is now a fairly well established fact that the quality of steel, the features of design, and the mode of treatment are the factors of importance rather than the mere question of the types of the springs adopted. Types of springs can be adopted to suit the general features of cars, and the level platform, so much to be desired, will mostly depend upon the other factors.

Practice in Axle Construction—Front axles are very largely of the "I" section, while knuckles are of divers designs, as Elliot, Lemoyne, Mercedes, etc., with splendid proportions of the steering mechanisms and a special reference not only to liberal bearing surfaces but adequate means of lubrication. When reference is had to rear axles, the types diverge, depending upon shaft or side chain drives. In the cars utilizing the side chain drive, the "I" section axle is in full force, and it is not uncommon to observe the distance rods of the same section, primarily because of its strength.

With live rear axles there is still a considerable amount of featuring in various directions, but it is plain to be seen that all designers are in favor of increasing the ground clearance under the different housings and increasing stability by the use of more stable truss rods, if they must be used at all. There is a prejudice in favor of the elimination of truss rods, and there are a few examples of rear axles in which



A STRONG DIFFERENTIAL BRACKET



A CHARACTERISTIC SUB FRAME

autogenous and electrical welding methods are resorted to with a view to the fashioning of the enlargement of the members to accommodate the differential housings in this class of axles.

Semi-floating types of rear axles seem to be very common, and designers are pretty evenly divided between transmission sets in conjunction with rear axles and the same transmission sets as separate units swung on the frame, excepting in the self-contained power plants, in which the transmission sets are integral therewith. Of materials, it is to note the same degree of improvement along consistent lines.

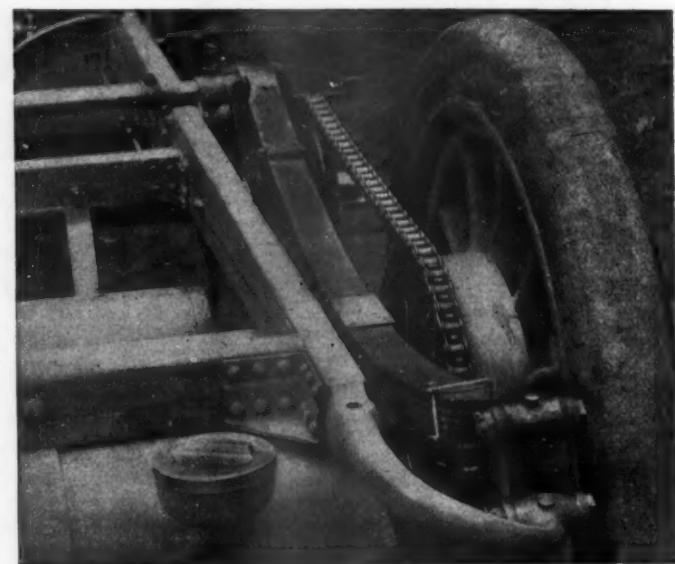
Some Ruling Dimensions—The advent of the long wheel-base has brought about specific reforms by way of stiffer frames, an increased number of laterals, and better ties. It is now a fairly established fact that the chassis frame should be relatively heavy, if a level platform is desired. Road inequalities, as they affect the springs, will react with a consequent secondary motion of the lightest series. If the chassis frame is heavier than the parts below the springs, the motion will be imparted to the parts below (axles, wheels, etc.), rather than to the frame itself. The law says "a mass will be diverted from its habitual direction to an extent inversely proportional to the weight," etc. Result, if the axles, wheels and parts below the springs are lighter than the mass above, the excess motion will be imparted to the series below. The cars of today are in harmony with the laws, and the builders of automobiles more nearly understand how to bridle the forces.

Improvements in Materials Demanded by Service—There is no part of the automobile that has undergone so much change in so short a time as the materials used in the various parts of the chassis. The earlier examples of cars had side members of regular structural shapes, as T's, L's, and, for the heaviest work, channel sections. The material used in these products was substantially mild steel in which the mettaloids were held at quite high values. The introduction of the pressed steel frames in irregular channel sections was not at first attended by the utilization of fine material. It was soon found that alignment was conspicuous for its absence after a little road service, because the materials of which the side frames were made had not the requisite rigidity in the first place, and no attempt was made to counteract the ills of sagging.

Discriminating designers soon reached the conclusion that special grades of material would be necessary, and that sagging

would have to be fortified against by some means or other. Some of the more ingenious of the designers proposed to put an initial sag in the side members by merely shaping them in the press with an upward camber and in the latter process subject them to sufficient pressure to bring on a permanent set, incidentally eliminating the upward camber, hence straightening them out. This practice was resorted to in notable cases, and frames so constructed rarely, if ever, gave any trouble at all.

Other improvements were by way of deeper channel sections and a greater width of flanging at critical points, but the greatest gain, aside from the matter of correct design, came from the use of the finer grades of alloy steel. In some notable instances nickel steel, quite low in carbon, was adopted, and silicon-manganese products have found a wide application. A goodly number of the frames, however, are the product of spring steel of the low carbon genera. Certainly the materials that would serve well in springs would logically serve as side members, because while it is true that spring steel has certain properties requisite in springs, it is at the same time a product of a high initial rigidity. This is not to say that the conventional spring



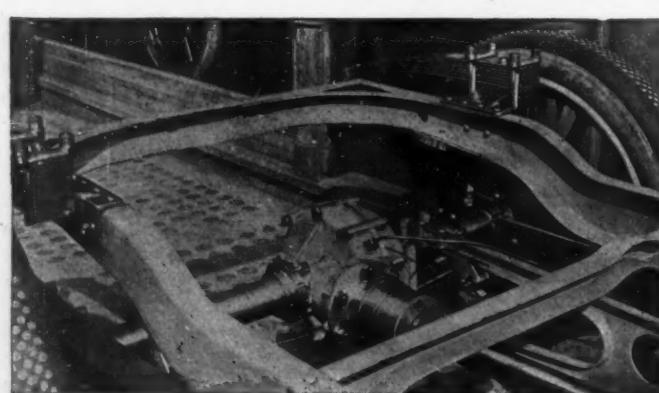
REAR SPRING SUSPENSION, WITH SIDE CHAIN DRIVE

steel of the market as ordinarily used in railroad car springs would be valuable for this purpose.

Some of the best examples of cars employ "government inspected" boiler plate in side frame members. This is, of course, fine material to work, and it seems to stand every test, as well as the exigencies of service. Its underlying characteristic involves the use of fine grades of ore in the O. H. process, limiting carbon to about ten points. There are special lines of side frame material to be had, but it is doubtful if they differ very much from what are generally known as the better grades of flange steel, or, for that matter, of the boiler plate above referred to.

At all events, irrespective of the exact grades of materials used in the different cars, there are none so poor as to support the ordinary grades of steel as found in the cold pressed side members of even two or three years ago. But this is not to say that unsatisfactory service was due to materials even in the majority of cases, since some of the earlier designs looked as if they were fashioned for the specific purpose of failing in service. Of course, they were not; the problem was new, and designers lacked experience. A controlling factor was often-times a distinctive appearance.

It was not at first supposed that lateral supports would prove to be of any great advantage by way of stiffening the chassis as a whole. It was soon found, however, that the examples in which the lateral members were well designed seemed to do the best work, affording the greatest measure of rigidity.



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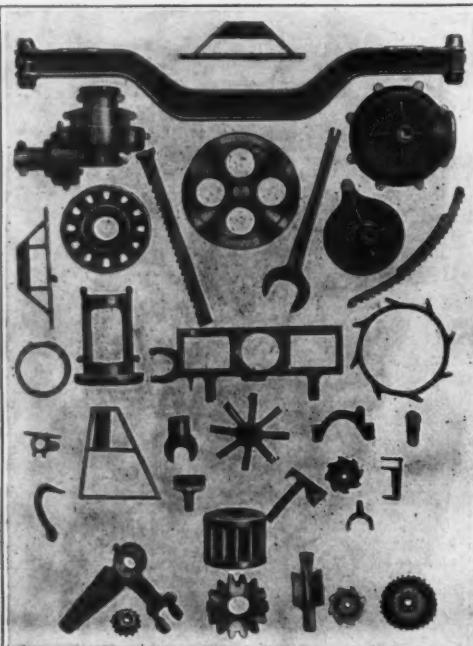
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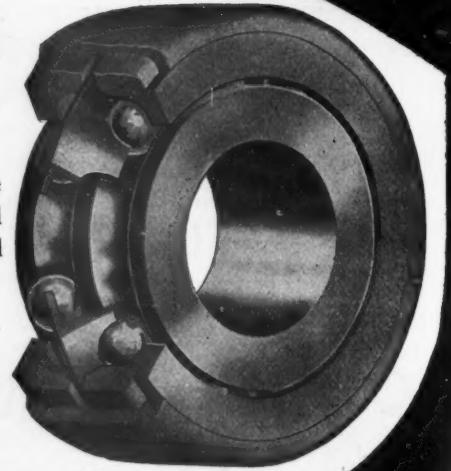
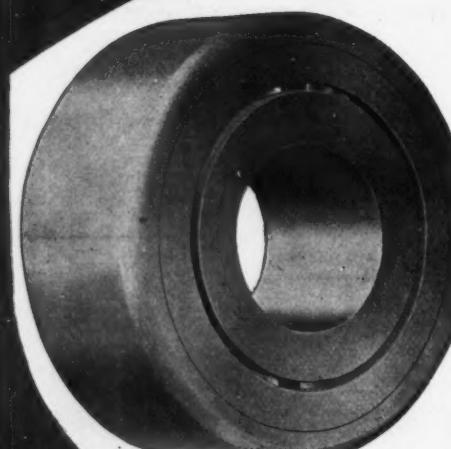
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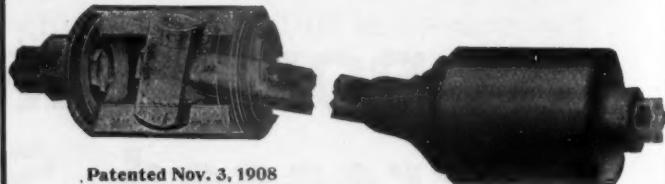
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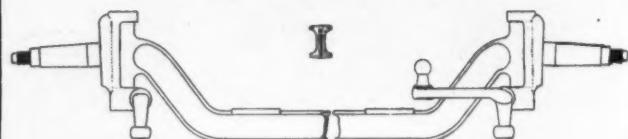


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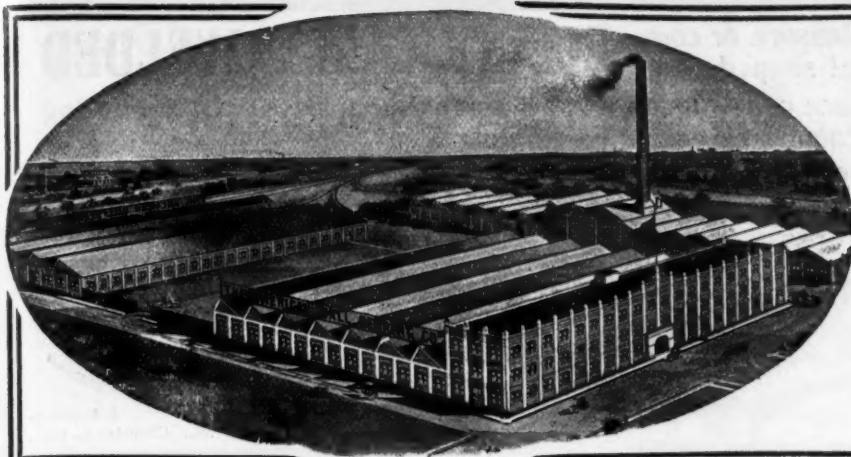
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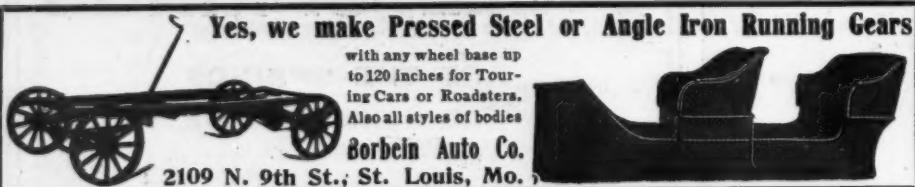
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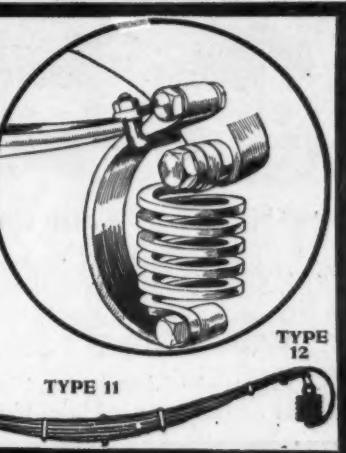
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Power Plant Section

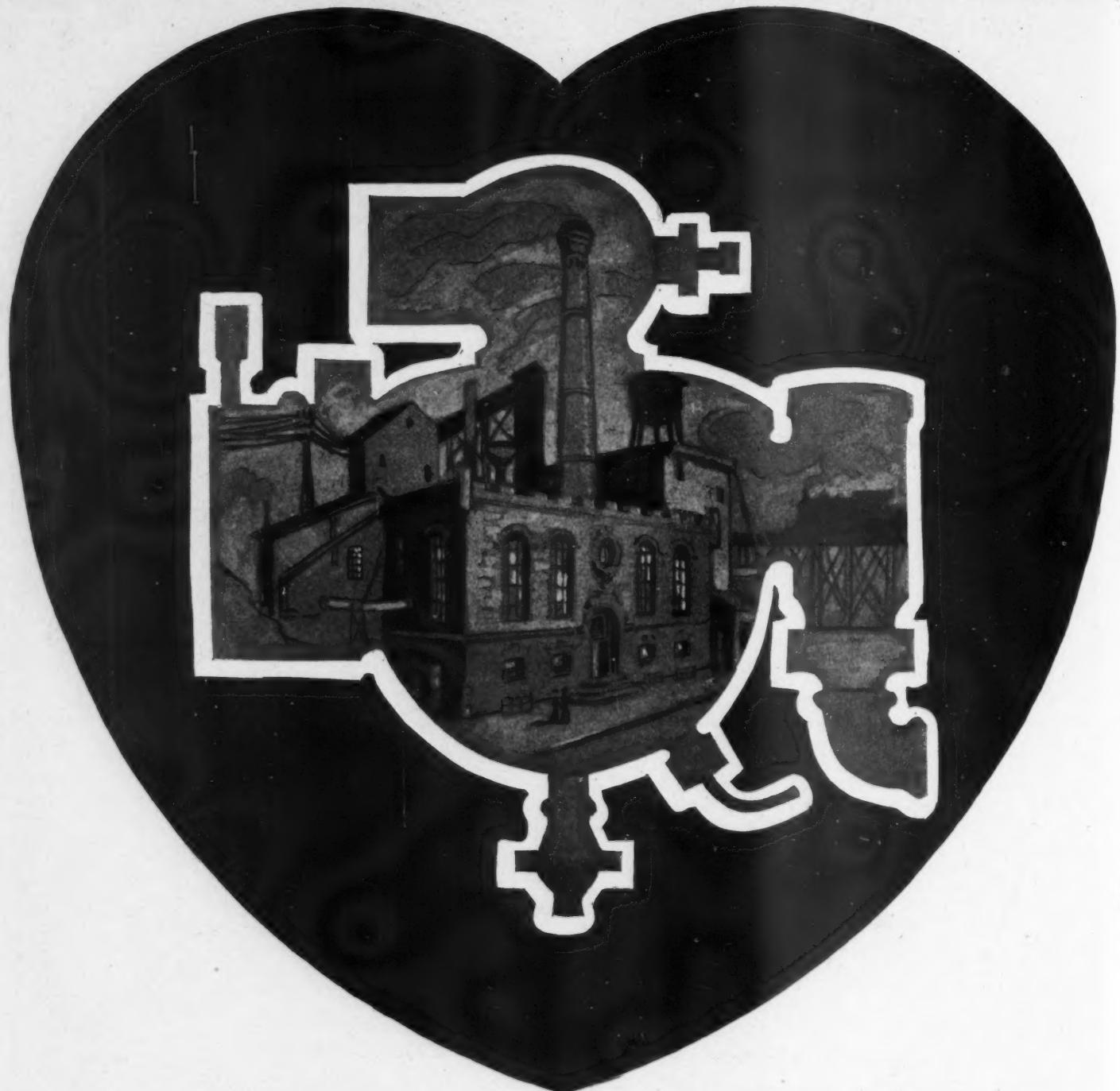


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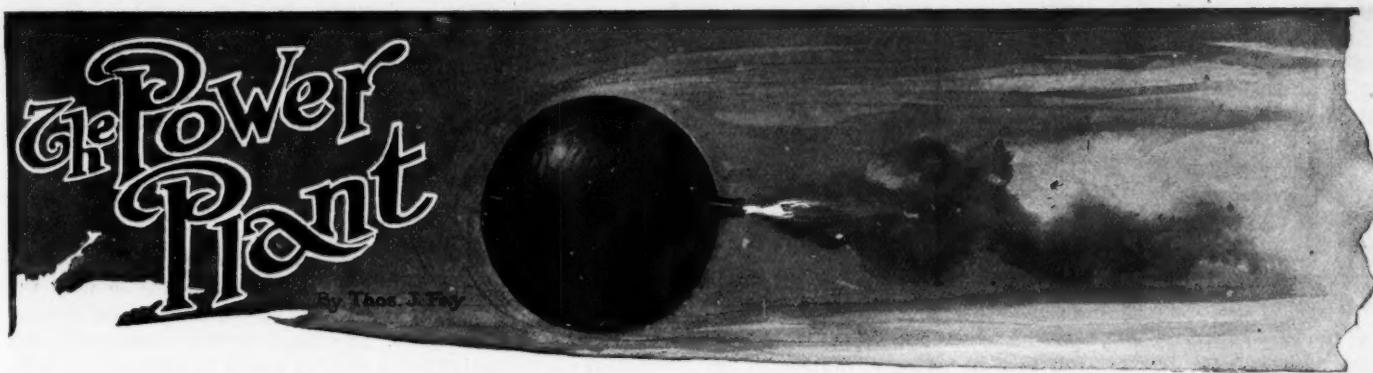


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CANDIDLY, the progress made within the last year by way of improvement in the power plants of automobiles was so diversified and in many ways so given to detail as to preclude a thorough attempt at reiteration. There were no radical departures from the beaten paths, however, nor evolutions beyond the pale of conservative practice. The several types of motors in their respective spheres of influence maintain that sturdy and growing importance which is servile to lawful manipulation, and is more nearly invincible to reoccurring and unpleasant happenings than even the most optimistic might have anticipated.

At the beginning of the year the single cylinder motor was looked upon somewhat less favorably than its true merit warranted. The double opposed motor was threatened by the four-cylinder type, and the four, in turn, seemed crowded by the many and undeniable advantages of its flexible neighbor, the six. These apparent controversies proved as chaff before the wind—to be forgotten—in the demand for cars, typical of each of the types of power plants and characteristic advantages.

It seems assured that further experience has established the facts that the earlier defects incidental to the several types of motors were due to vagaries of design, faulty materials and indifferent construction. This last year was one of noteworthy events, due in a measure to the threatening financial situation, which, however, augured for good, in that it produced the incentive ending in a thorough house cleaning.

The live concerns eliminated the faults of which they had become cognizant, revised their methods and evolved among other things power plants for their cars that would seem to spell finality. The earlier complaints were duly weighed, the question of the duplication of parts was rendered more nearly an accomplished fact, and the production of repair parts, both in point of cost and utility, were afforded the due measure of attention to which they were entitled.

The Trend of Motor Improvement

To fully appreciate the situation it will be necessary to subdivide the power plant and discuss the respective features by themselves. The motor, for illustration, as an abstract proposition, can receive treatment, irrespective of the number of cylinders, since the question of improvements will be the same.

Cylinders Were Perfected.—From the start the cylinders proved to be rather troublesome, and it is to the everlasting credit of the makers of cars that they finally produced motor cylinders quite as free from troubles of any sort as any reasonable person can possibly expect. The improvements did not take root by way of adding weight, indeed; the whole situation can be summed up by saying they added quality instead. But this was not an easy matter; the foundries had to be educated up to the exacting requirements, and in the earlier times they refused to stand for the ducking, excepting at a price, which perspicuity was not with a definite assurance from them that the quality of the cylinders would be up to a fitting standard. Time wrought changes, and the last year was the one of marked advances, from the foundry point of view.

In the meantime patterns were more nearly in accord with the needs of the occasion, and between the more suitable pattern work, the better foundry practice, and the clearness of precision

of designers, cylinders were produced in quantity, of great strength and suitable for their respective purposes, whether they were to be water cooled or by an air draught instead.

Crankshafts Are Die Forged.—It was just about a year ago that the crankshaft question was most agitated, for then it seemed inevitable that slabbing would have to be resorted to, in order to make crankshafts of the quality demanded in service. In the meantime, the threatened invasion did have its effect, and the drop forging interests made experiments leading up to what is now commonly termed toughened drop forgings, in which the materials have properties imparted to them by special heat treatment, such as were never before known to the automobile or any other industry.

The process was found to be most exact, cheapening in its trend, and fortunately propitious in the time of its coming. This process lends itself equally to such other parts as connecting rods, camshafts and multitudinous small parts, of which automobiles seem to have a liberal share.

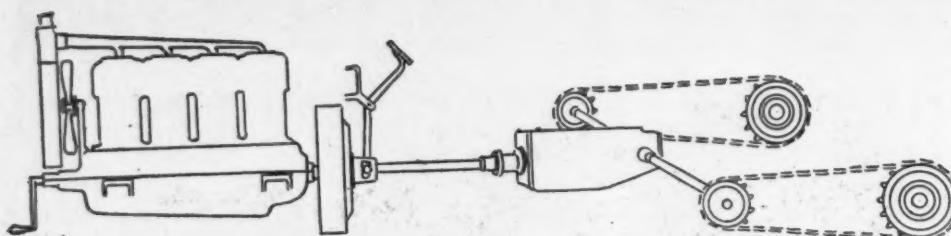
Crankcase and Bearings Related.—Strides have been made in the testing of aluminum, thus rendering it safe and profitable to employ this light and, on the whole, very desirable metal in work of this character. This improvement is one of the distinct advances of the year. In earlier times the aluminum castings were good in the main, but they were not used by some of the makers of cars, because manganese bronze is considerably stronger, but it is considerably heavier as well.

It will be proper to discuss the question of bearings in connection with crankcases, since a bearing *per se* would be of no utility, without a resting place of considerable stability. It matters not at all if the bearings are the one or the other of the available types, when reference is had to alignment, and during the last year this problem was solved to a double purpose. It was noise that brought about the change, for in trying to eliminate noise it was discovered that thin castings defeated the project, in that they were largely responsible for much of the remaining noises in cars, as they were a year or so ago.

To thicken the walls seemed to be a necessity, and this thickening process was, of course, possible, in view of the very light weight aluminum, and, too, in view of the extended use of die (drop) forgings, in that the noises were subdued, and the bearings were kept in more perfect alignment, since the increased thickness of the shell resulted in increased rigidity of the bearing supports and absence of trouble.

Ball and Roller Bearings.—It was pointed out how the process of eliminating noise resulted in a more stable housing for the bearings. In relation to the bearings, it might be well to observe that the tendency is in the direction of ball and roller bearings up to the limit of the ability of designers to eliminate plain bearings, with their shorter life.

That designers have pursued a sensible and conservative course is rendered manifest by an inspection of the cars of the year; they have not, for illustration, attempted to put ball or roller bearings on connecting rod bearings. When it comes to crankshaft main bearings, they have been guided by broader considerations than the mere question of the utilization of ball bearings for the sake of being able to say that they have them. Such



OUTLINE DESIGN OF TYPICAL SIDE CHAIN DRIVE POWER PLANT

of the cars as employ ball bearings on the crankshaft main bearing position were evidently justified in taking advantage of the excellent qualities afforded. In the types of motors involving plain main bearings for the crankshafts, there were considerations that outweighed the advantages of ball bearings, and the finer qualities of main bearings were employed instead.

When it comes to the transmission gearset, there are few or no examples of plain bearings. The spindles are centered in nearly every case on either ball or roller bearings. When ball bearings are found, they are almost invariably of the radial type; and when it comes to roller bearings, they are largely of the conical type.

Likewise in the axles, the plain bearings are scarcely to be seen at all, while the ball and roller bearings are in great profusion.

The Principle of the Three-Point Suspension—This principle has been extended during the present year to include cars in general. The question of bearing alignment was a strong argument in favor of resting the power plant units on three points, or the equivalent, instead of depending upon the rigidity of the side frames. The mode of the application of the principle is not the same in all cases, but the dominant idea is uppermost in each of the several examples. In some cases the uninitiated would fail to discover the principle of the three-point suspension, because in resting the units on more than three points there is an apparent diversion from the principle involved; and the uninitiated would fail to discover that rigid ties are limited to three points only.

Speed vs. Power—In the old days, motors were run at a low speed, and the power was a minimum for a given weight. Gradually the question of increasing speed took a hold, and within the last year this matter was crystallized into short stroke high-speed motors, in which the weight efficiency is very high indeed. Remarkable as it may seem, the fuel consumption diminished considerably, although some forecasts were to the opposite view.

The short stroke motors are light; the strength of the component parts would naturally increase, because in such motors the parts are short and relatively thick. The deflections diminished and the mechanical efficiency increased as a natural sequence. The mere decrease in the length of the stroke did not at first promise so much as after events disclosed. On second thought it would have been rendered quite plain that increased mechanical efficiency would follow any increase in rigidity, since the way to make a thing rigid is to make it short and thick.

Valves and Timing—While it is true that the valves are not made of greater area than of the previous practice, it is equally true that the relation of the areas of valves to the areas of cylinders has undergone a change. This change in relation is assignable to the fact that the bore of the modern short stroke motor for a given power is less than the bore as is obtained under the old conditions, but in reducing the bore of the cylinders a corresponding reduction in the area of valves did not follow, hence the change in relation in favor of an increased volume of mixture or power and better cooling conditions.

Dual Ignition Systems—The new products are so thoroughly fitted out with ignition devices as to preclude any change of justly conducting any of the old line of strictures. The magnetos of the present time are thoroughly scientific, well made

and deliver a spark of great energy at the proper instant. They serve every purpose required of an electrical system, excepting for lighting, and it is to be regretted that the magneto system does not seem to lend itself to this important matter.

It is almost unnecessary to point out that the "rotor" of the magneto must change in speed because the magneto must synchronize with the speed of the crankshaft, which shaft

rotates at a variable speed. The magneto then cannot deliver a constant electromotive force such as would be required in lighting work. A speed regulator is complicated.

The direct current system of ignition, using a small dynamo, is of course available for the double purpose and is preferred by many on that account. In these days, with the new types of coils, equipped as they are with the "master vibrator," the petty objections to coils are wiped out, and the direct current systems more nearly lend themselves to the problem than ever before. In conjunction with the coil systems, the modern storage batteries make combinations a good second to the magneto, and most cars are fitted out with the dual system. In some cases, because of the splendid advantages of the master vibrator, in conjunction with the coil system, it is the practice to use the storage and the dry cells to the exclusion of the magneto. This scheme is reliable, economical, and the first cost is the minimum for good results.

The Fuel Systems—At the beginning of the year the question of alcohol was hot off the grid, but gasoline is the fuel upon which reliance is placed, with small chance of a change for some time to come. As long as gasoline can be had it will well serve the purpose, and its price will have to more than double perhaps to afford other fuels a chance to compete.

It is pleasant to note that the cars of the present date are fitted out with good and sufficient copper gasoline tanks, of excellent workmanship, involving sweated and riveted joints. It is also observed that, as a rule, a water pump is provided, and baffle plates are placed to prevent the surging of the gasoline in the tank. The fastenings of the tanks are also strong and securely placed, as they should be.

Piping and Fittings—The new cars, without respect to price, are provided with suitable gasoline piping, which appellation can well be applied to the oil and other piping in and about the cars of the present time. The chances of a stoppage are remote, and the strength of the piping is well within bounds. The fittings are strong, light, tight and of the ground joint class; one may quickly remove a section and, after blowing the same out, replace it without fear that a tight joint will not be made.

Carburetors Reduced to Practice—The float feed type is still with us, carrying many improvements, mostly in point of detail, to be sure. The trappy, loose jointed and mysterious affairs, once the master of us all, can no longer be found on automobiles. Under the new conditions the needle valves, for illustration, are more nearly tight, and flooding is controllable.

The copper or cork floats are nicely constructed, not likely to become loggy, and means are provided for scavenging the various recesses of the carburetor of such jelly-like aggregations as would, of course, lend trouble were they allowed to remain.

The float feed type of carburetor is not alone in the field, since there are illustrations of the Krebs idea, and in certain classes of work, notably in connection with the two-cycle motors, injectors are making headway, promising overmuch.

It may be well to call attention to the growing use of the hot water idea of eliminating the refrigerating effect due to the evaporation of gasoline; it works well.

Spark Plugs in Profusion—Spark plugs were improved in so many ways in recent times that it is a little difficult to specifically enumerate any considerable number of them. Automists will be interested to know that the grade of porcelain is now up to a standard such as will practically exclude the annoying

ignition failures, once the bane of the spark plug. The packing around the insulation, which may be of porcelain on the one hand and mica on the other will not be the cause of cylinder leakage in the well-made spark plugs now to be had.

The A. L. A. M. standard thread for spark plugs is now quite extensively adopted, and from appearances it would seem as if the matter will simmer down to one standard thread for all spark plugs, in so far as American cars are concerned.

The Utility of Mufflers—In the earlier examples of mufflers, if the noise was damped, so was the power. It required a good deal of effort and some ingenuity to eliminate the noise of exhaust without suppressing the power of the motor. Modern mufflers accomplish this, and they are provided with muffler cutouts, mostly to make a noise.

The Cooling Systems—During the cut and try period it was the system of water cooling that had full sway. Air cooling seems to have been retarded somewhat, possibly because it is a more difficult engineering feat, or, better yet, due to the absence of reliable data on the subject. The splendid service rendered by air-cooled motors, despite the obvious difficulties that beset the earlier designers, has resulted in an astounding growth of this branch of the industry, contrary to forecasts on the part of those who failed to observe sufficiently close. That the air-cooled situation is on a healthy basis is so well known as not to require comment.

Referring to the air cooling situation, there are two dominant ideas, the one of which involves a direct air blast, while the other affords a greater volume of air over a greater surface, under conditions not so pronounced in point of air pressure. There are differences in details of design of the cylinders, valves and other details, when reference is had to the air cooling method.

Water Circulation—In this connection there are two fundamental ideas, the one of which takes into account the "thermo-syphon" system of water circulation, while the other involves forced circulation by means of a pump. In the thermo-syphon system the circulation is natural, due to the difference in weight of hot and cold water. The cooler should be somewhat larger if the thermo-syphon system is used and the propeller blades of the air fan should be most carefully proportioned. That these matters have been taken care of is proven by the fact that the thermo-syphon system is backed up by a horde of enthusiastic autoists, who lay stress upon the absence of the water pump; and such complication as its presence would naturally dictate.

By way of coolers (radiators) there are splendid examples of the respective generic types to be seen at every hand. The cooling ability has been reduced to a fine art, and the weight factor is approximately two-thirds of what it was a year ago. The stability of coolers has been accentuated, and, on the whole, this phase of the situation is truly up to date.

Water pumps are much improved, and among them will be found the centrifugal type, the paddle wheel modification thereof, the gear pump, and of late something by way of an oscillating paddle pump, said to be efficient.

Clutch and Flywheel—These members, while they perform separate functions, are usually in conjunction with each other. The flywheel absorbs the surplus energy and gives it back again when the motor is least capable of delivering power. In this year's products ample provision is made in this respect. The clutch problem, on the other hand, is one involving the control

of the speed of the car, with the motor running continuously. This problem is met in diverse ways, prominent among which are (a) multiple disc clutches, (b) leather-faced cone clutches, (c) the same with cork inserts, and (d) flat band clutches, with metal to metal. In some of the examples of disc clutches (submerged in oil) cork inserts are used, while in other examples the oil is dispensed with.

Transmission Gearset—The gears are of alloy steel in nearly every case; three speeds and reverse holds the center of the stage, and the selective system is very popular indeed. Direct on the high gear dominates the situation, and the entire absence of noise is a conspicuous feature in *high gear*. As a rule, the cars are light enough to stand for high gear on all but the most unworthy roads and on grades, with occasional exceptions, so that the fourth speed is not missed. Certain types of cars are provided with the fourth speed, and in such cases the direct drive may be on third or fourth speed, depending upon the dictates of the designers.

Propeller Shaft—The shaft drive is most conspicuous, and in the light touring cars of moderate power it is almost to the exclusion of the chain drive. The propeller shaft lines up almost for a straight-line drive, so that the universal joint is not required to transmit at any considerable angle. Radius rods are strong and work on very nearly true centers, so that "cramping" of the rotating parts is conspicuous for its absence.

Jackshaft—The differential is on the jackshaft (as usual) and in the side-chain drives, within the gearset housing. In the shaft drive cars the live rear axle takes the place of the jackshaft, and the year's crop of live rear axles are excellent illustrations of the advances made. The floating type is well represented, but the greatest advances were by way of stiff trusses, in the examples of live rear axles using them, although it is worthy of note that the trusses are dispensed with in some cases, involving expanded tubes.

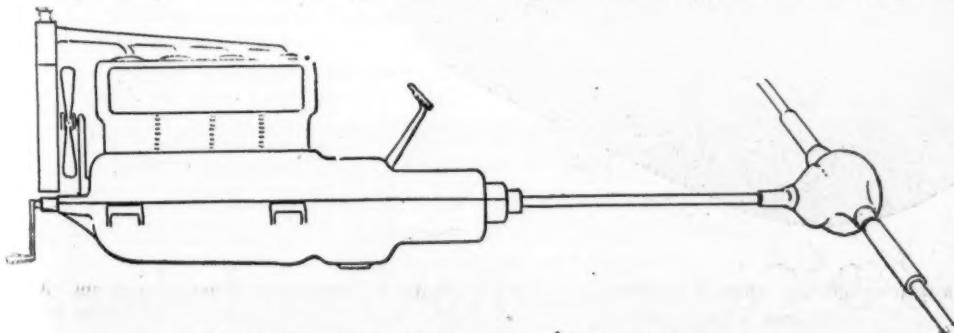
Provisions for Oiling—This important subject was purposely withheld, since it relates to the whole power plant rather than to the motor alone. Forced feed lubrication is now common, whereas last year it was in isolated cases. A single "tell-tale" is frequently used, and the oil is fed to the vital parts of the motor, to the universal joints, the gearset and, in fact, to every place requiring liquid lubrication, in the best examples.

In place of a small hole, to receive mud *all the time* and a drop of oil *occasionally*, grease cups are used in some profusion, and the saving in repair accounts should be considerable in consequence. The hard lubricant is extended to the gearset and the universal joints. Indeed, autoists are fast becoming acquainted with the virtues of grease as a lubricant, not to forget that graphite has its strong adherents as well. It is lubrication that saves repairs, and the makers of cars have put it up to users this year by ways adequately provided for the contingency.

Protection from Mud—This phase of the question never did receive proper attention until very recently. In the present examples, it seems, an attempt was made to compensate for past neglect. The aprons are neat fitting, easily adjusted and so designed as to protect the power plant from splashing and dust.

Perfect Ease of Control—With the selective speed changing system, clutches free from spinning proclivities, splendid brakes, precision of timing, perfected carburation and a nice relation of the

motor power to car weight for speed, the autoist is provided with every requisite essential to the control of the present type of cars, whether or no he counts among his accomplishments great skill in the process. In some cases the planetary change gear systems are used to great advantage, having two speeds and reverse, counting as a prominent advantage the fact that with them a mistake is impossible.



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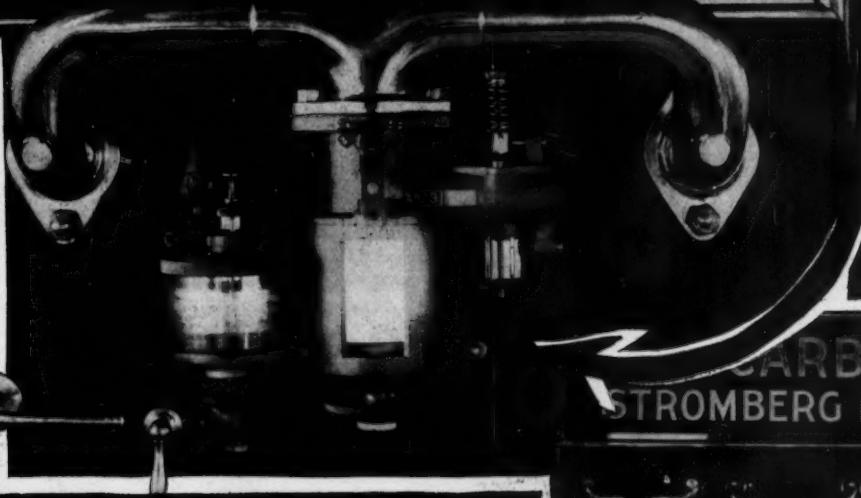
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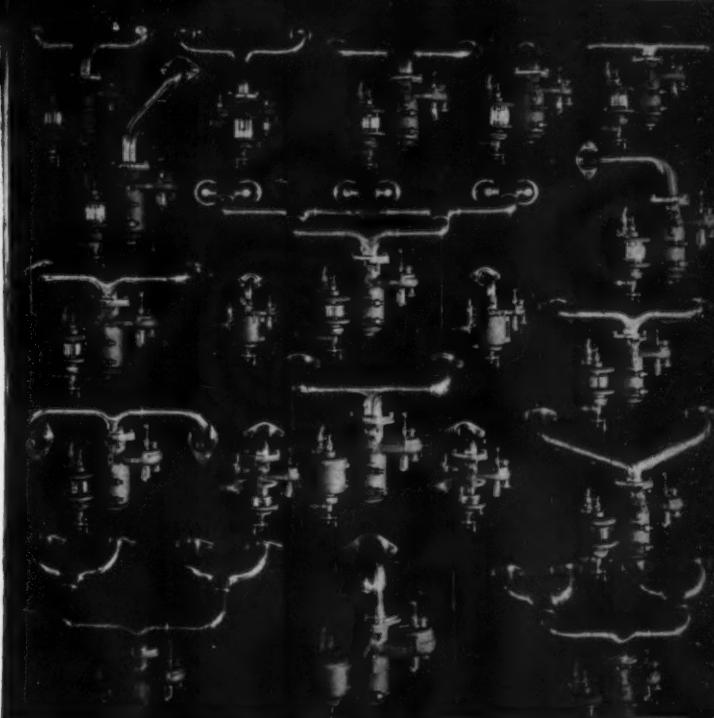
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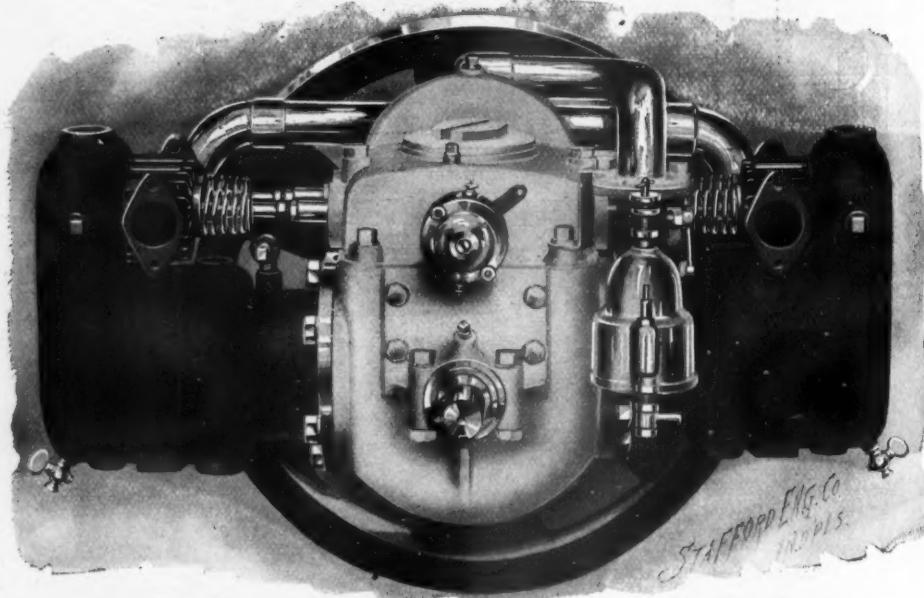
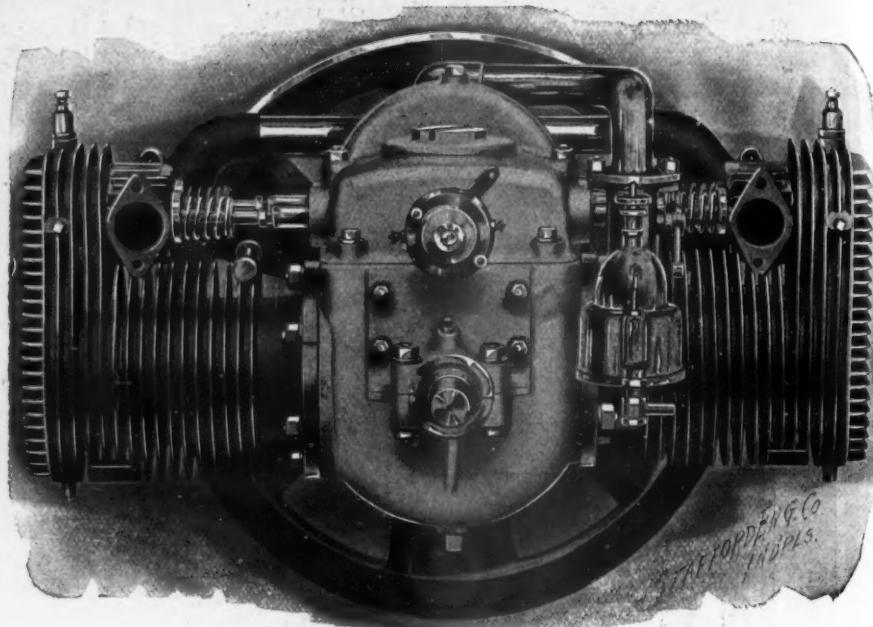
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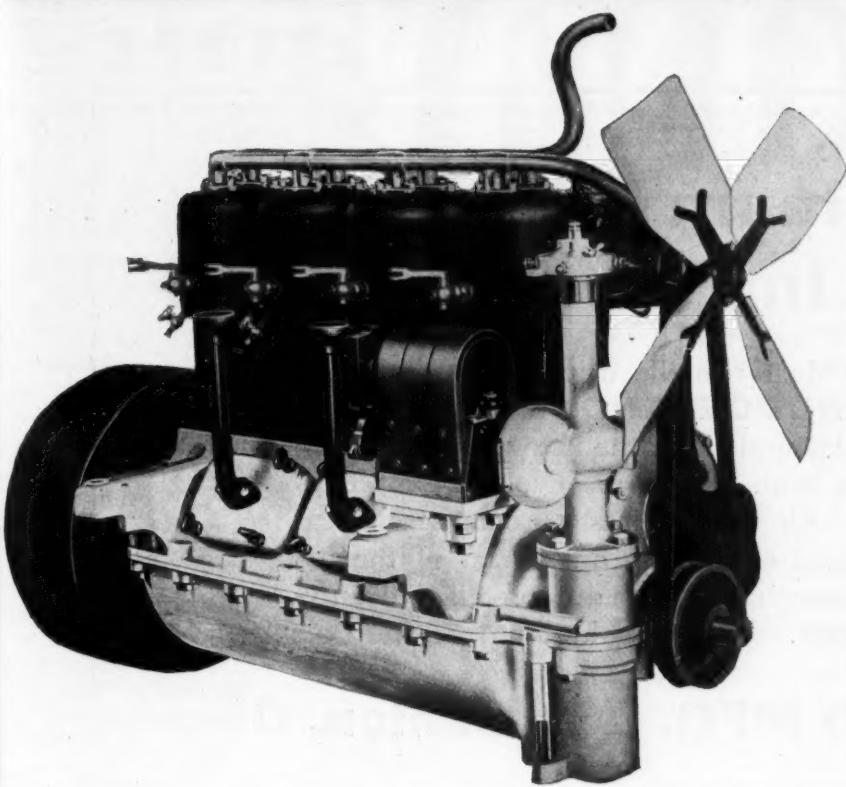
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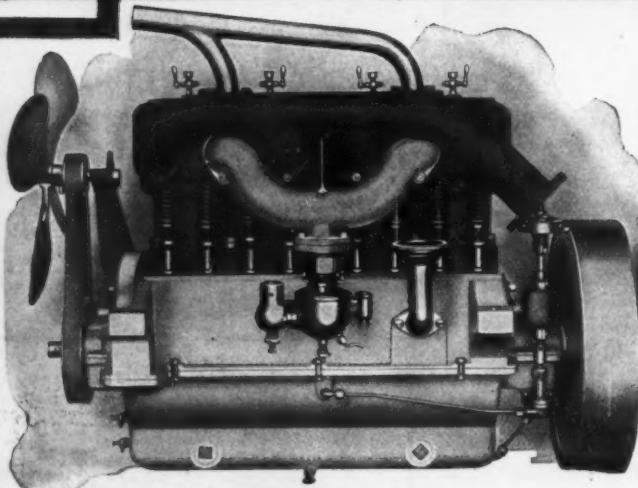
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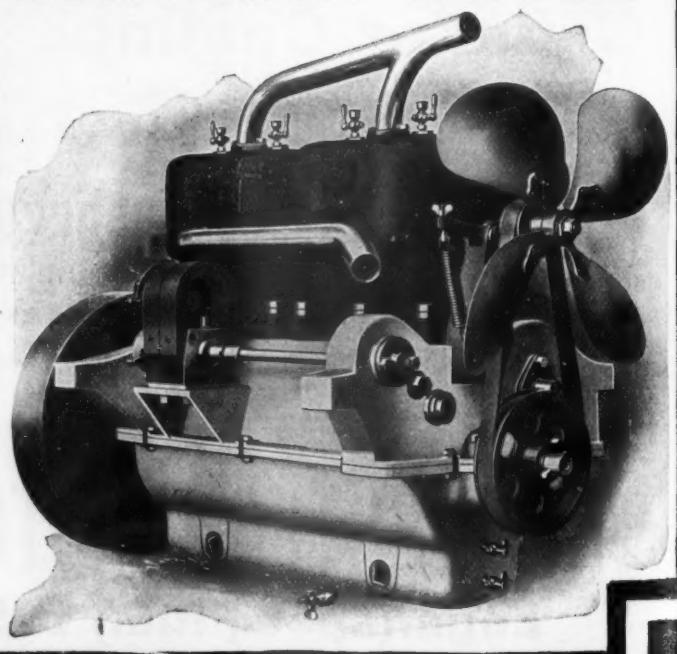
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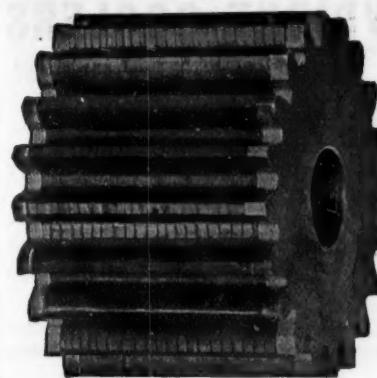
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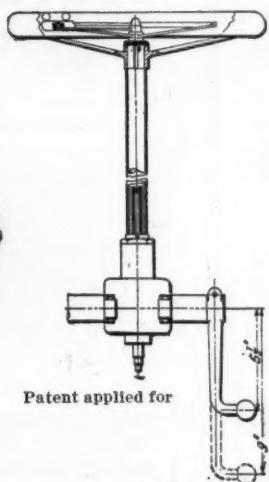
IS A
NORTHWAY MOTOR



WIDMER



TRIO of good things, any one or all of which should have use by you in the betterment of your 1909 cars. The WIDMER TRIO represents all that's best and most desirable in their several classes, and business sagacity on your part should lead you to an instant investigation, looking to their adoption as a part of your 1909 car equipment.



Non-Swell Gears

The filled gears that can be run in oil or out of oil, that retain their shape and are always noiseless in operation.

Universal Joints

Absolutely dust-proof and self-lubricating, especially adapted to heavy duty and constant torsional service.

Little Giant and Buggyabout Steering Gear

An exceptionally compact and powerful gear, made to withstand abuse and hard service and not cost much.

WRITE FOR FULL PARTICULARS AND PRICES

C. A. WIDMER MACHINE WORKS, (Incorporated)

45-47-49 Fort Street East

DETROIT, MICHIGAN

Heitger Model C Carbureters

Our special types as shown are giving the greatest of satisfaction on the cars mentioned, are giving satisfaction where other makes have failed, in hundreds of cases, and guaranteed to give you satisfaction.



This model has mechanical control over gasoline feed to mixture, so that the feed is positively controlled according to air admission and throttle opening, accomplished by a simple and reliable construction, without any delicate parts. Has large deep float chamber, swiveling to any position, simple float level adjustment, and strainer at gasoline connection. High in quality, low in price, fully guaranteed to give satisfaction. New catalog now ready.

HEITGER CARBURETER COMPANY
235 West South St., INDIANAPOLIS, IND.

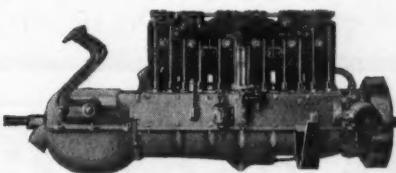
Nearly Everyone Knows that

BROWNELL MOTORS

FOR 1909

ARE EMINENTLY SUPERIOR

in
design, construction, power, economy and in perfection
of details.



Power Unit
6-cylinder, Model A, 20-25 H. P. Automobile Motor.

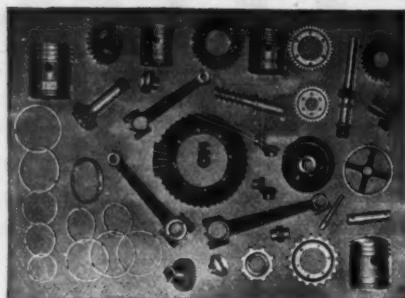
This complete power unit (in both 4 and 6 cylinders) is unqualifiedly the most desirable proposition on the market, for the Automobile Manufacturer or Assembler. Hence its great popularity.

Our line embraces Motors for a great variety of purposes. In 4, 6 and 8 cylinders, from 14 to 150 H. P.

A postal—a Catalog.

F. A. Brownell Motor Co.
ROCHESTER, N. Y.

AUTOMOBILE PARTS



We make automobile and motor machine parts like these shown in cut better and cheaper than others, and give prompt deliveries because we have the facilities to turn out the work right.

SPECIAL: Cams and complete Cam Shafts, transmission to dimension) made by special

square driving shafts (all ground equipment of our own design.

GENERATED GEARS OF EVERY DESCRIPTION



FINISHED DIE-CAST BEARING BUSHINGS Made to Specification

Let us submit estimates based on your specifications and blue prints.

AIR COMPRESSORS

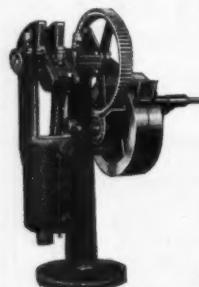
BELTED — MOTOR DRIVEN



Single and Three Cylinder Styles, air or water cooled.

All modern garages use them for inflating tires, cleaning cushions, etc.

A compressor designed for hard, continuous service.



THE F. W. SPACKE MACHINE CO.

INDIANAPOLIS, IND., U. S. A.

See those Grooved Disks



Hele-Shaw Clutch

25,000 Used in Europe

Why is it used on the Mercedes, Napier, and other leaders abroad? Also by F. B. Stearns in America?

SEE US AT THE SHOW AND LEARN THE MECHANICAL PRINCIPLE INVOLVED
MERCHANT & EVANS CO. (Mech. Dept.)

Philadelphia, Pa.

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WRIGHT COOLERS

COOL THE HOT-

TEST ENGINES

and

DO NOT LEAK

Guaranteed the best. Ask the users. Catalogs Free.

WRIGHT COOLER & HOOD MFG. CO., 1549 MICHIGAN AVE., CHICAGO

BEAVER MOTORS

6 cyl. Vertical, 40-45 H. P.
4 cyl. Vertical, 25-30 and 35-40 H. P.
2 cyl. Horizontal opposed
10-12 and 14-16 and 18-20 H. P.
4 cyl. Horizontal opposed (special for commercial trucks) 35-40 H. P.
Center crank oiling device—4-cycle. Free booklet.

BEAVER MFG. CO., 145 BURRELL ST., MILWAUKEE, WIS.



If you want good circulation on your automobile, launch or motor boat, use a

LOBEE PUMP

LOBEE PUMP AND MACHINERY CO.
240 Terrace, Buffalo, N. Y.

CORK INSERTS

For particulars apply to the

OWNER and PATENTEE

The NATIONAL BRAKE & CLUTCH COMPANY
16 State St., BOSTON, MASS.

10 H. P. Double Opposed Engines, \$74.

Made by prominent concern. Reliable, high-grade, late model, up-to-date engine—only few left at this price. Highest grade material and construction. Planetary Transmission to match, \$27.50.

THE PHOENIX AUTO SUPPLY CO.
A. L. Dyke, Mgr.
3632 Olive St., St. Louis, Mo.

DO YOU WANT to dispose of your car? DO YOU WANT to buy a second-hand car?

ONLY COSTS 20 CENTS A LINE, counting 7 words to a line, to advertise your wants in Miscellaneous Column of MOTOR AGE.

Insist Upon a Radiator EASILY REPAIRED



**LONG'S
RADIATORS**

are the only ones on the market that can be repaired when an accident is met with. Any broken tubes can be replaced with new ones at a small expense. Other makers of radiators when damaged must be entirely replaced at a heavy expense.

SEND FOR
CATALOGUE

LONG MFG. CO. - CHICAGO, ILL.

MULTI-UNIT MOTORS

18-20 AND 23-25 H. P.

For Given
H. P.
there is
no engine
on the
market so
light and
compact.

Absolutely
FREE
from vi-
bration
and
pounding.

We want
to explain
to you
WHY.

Two
cylinders
in one.

Two
pistons
in one.

Cylinder
and
Crank
Case
in one.

Two
Castings
—One
Engine.

Patents Applied For

4 CYLINDERS LOOK SHARP!

THE
DESIGN
IS

NEW!

THE
PRINCIPLE
IS

NEW!

THE
FEATURES
ARE

NEW!

The Multi-Unit Engine is comprised of 4 cylinders horizontal, cast in pairs. Each pair is in direct line with the other, having one solid piston for each pair of cylinders, with but one connecting rod for each piston. Thus we have two bearings on crank shaft instead of four, as on other types.

The double headed piston reduces the wall thrust, so serious in other engines, to a minimum on account of its great length; and being cushioned on each end of the stroke, all pounding is eliminated.

These engines possess great flexibility; by reason of the few moving parts, consisting of two pistons and two connecting rods only, instead of four; capable of being throttled instantly from 100 revolutions per minute to 1,500.

This feature, where used with a proper gear ratio, will prove very economical.

The exhaust ports are at the front and rear of cylinder, the intake on top at center; one port for two cylinders, nothing between the cylinders but water.

The head of the cylinder is curved with a drip cock at bottom. The piston is a dual unit casting, flat heads ribbed; these pistons are exceptionally long, making for very long life.

The water jacket extends the entire length of the stroke; in fact down to the crank case. The valves are entirely surrounded by water. The jacket and cylinder are cast integral in pairs.

Write for information as to other sizes, 4 and 6 cylinders.

MULTI-UNIT GAS ENGINE CO., DESIGNERS AND BUILDERS, CHICAGO
FULTON & ZINKE — GENERAL SALES AGENTS — 1256 MICHIGAN AVENUE **CHICAGO**

CONTINENTAL MOTORS

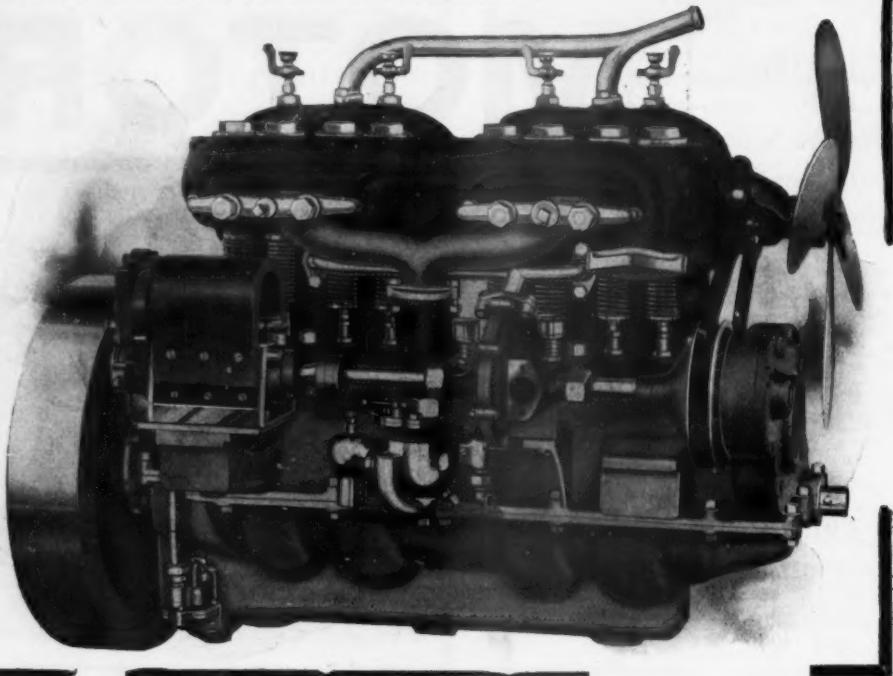
are manufactured in three sizes—Model "K" 24-28 H. P.; Model "G" 38-42 H. P.; Model "HB" 44-48 H. P. We, therefore, can meet your motor requirements whether they be for taxicabs or light runabouts, heavy touring cars or commercial vehicles. These motors are manufactured in the LARGEST AND MOST COMPLETELY EQUIPPED PLANT IN THE COUNTRY DEVOTED EXCLUSIVELY TO THE MANUFACTURE OF GASOLINE AUTOMOBILE MOTORS.

Our Designers and Engineers have given special attention to the self-contained oiling system, extremely long bearings, offset cylinders, separate water jacket heads, adaptability for mounting magneto, etc., and the result is that our motors are very efficient, compact, light weight and durable. We therefore justly claim that THERE IS MORE MOTOR VALUE IN A "CONTINENTAL" THAN IN ANY OTHER MOTOR ON THE MARKET.

Therefore, address your motor inquiries to the

CONTINENTAL MOTOR MFG. COMPANY
Muskegon, Mich.

K. Franklin Peterson, Western Representative, 168 E. Lake St., Chicago, Ill. Thos. J. Wetzel, Eastern Representative, 29 W. 42d St., New York City.



DON'T BE HELD UP BY A BUM CARBURETOR

Most efficient and dependable, and the Carburetor you will eventually use if you want the **BEST**

Why put off writing to us for full particulars of this improved Carburetor that will cost you very little and eliminate every Carburetor trouble, furnish a uniform mixture always, and increase the power and efficiency of your engine? **WRITE TODAY—DO IT NOW.**

WATT-DETROIT CARBURETOR CO.
62 Griswold St., DETROIT, MICH.

NOTICE CHANGE OF NAME

ROME-TURNEY RADIATOR CO., ROME, N. Y.

Formerly Long-Turney Mfg. Co.

Manufacturers of Rome Spiral Tube Radiators and Condensers

We wish the trade to know that we have made extensive additions to our plant and with the added equipment our facilities are ample to take care of the RUSH orders and contracts that buyers may be ready to place. Let us hear from you. Send us blue prints and allow us to estimate cost for your requirements.

ROME-TURNEY RADIATOR CO.

Rome, N. Y.

**The Ball Transmission
FOR
Automobiles & Motor Boats**

NEW YORK GEAR WORKS.
56 GREENPOINT AVE. BROOKLYN, N. Y.

**DO YOU WANT to dispose of
your car? DO YOU WANT
to buy a second-hand car?
ONLY COSTS 20 CENTS A LINE, counting
7 words to a line, to advertise your wants
in Miscellaneous Column of MOTOR AGE.**

McCord

RADIATORS LUBRICATORS

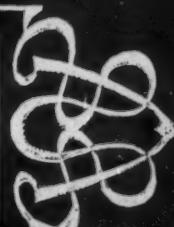
McCord & Co., - CHICAGO AND NEW YORK

Ignition Section



INCLUDING

Magnetos, Spark Coils, Timers, Spark Plugs, Batteries,
Electrical Fittings, etc.





Double ignition with one set of spark plugs is another Remy feature originated by us.

Starting may be done from the seat of the car without cranking—with the greatest certainty of any system starting from the spark.

We have sold on minimum specified deliveries over 17,000 Magneton for 1909 cars. More of these Magneton are already sold than all other makes combined.

With automobile manufacturers continually striving to build better cars than their competitors, there is a reason for their adopting the Remy Magneto.

It is designed by engineers who have been connected with automobile work since its beginning and embodies ideas suggested or approved by the largest manufacturers.

Our factory was built especially for Magneto manufacturing and is the largest of its kind in the world.

In the hill climb endurance run-speed contest—in all kinds of tryouts everywhere, the

Write us today. Address Dept. 14

Remy Electric Co., Anderson, Ind.

We have opened a branch house at Thoroughfare Building, Broadway and 57th St., New York

Our Show Exhibits are Located:

Grand Central Palace Madison Square Garden Chicago Coliseum
Gallery, Space No. 186 Space No. 125, Elevated Platform Gallery, Space No. 65

This is the Magneto that Stands the Most Abuse—See it at the New York and Chicago Automobile Shows

The Remy High Tension Magneto is designed especially for American Automobiles. The broadest margins for abuse—both electrical and mechanical—are afforded on the Remy. It is "fool proof."

Positive firing is assured by the Remy under conditions of oil, dirt and water that puts its competitors out of commission.

It will fire the motor properly running at a lower speed than any other Magneto in the world. This is a big point in cities, where cars must be run at low motor speed as often as high motor speed.

Anybody can install a Remy whether he is a skilled mechanician or not.

This is the Magneto without brushes. No brushes to wear out, give trouble or be replaced.

The Remy 1909 High Tension Magneto

Remy has more victories to its credit than all other makes combined. The Buick, equipped with the Remy Magneto, led all American cars at Savannah.

This is a sample of the letters we receive daily:
Boston, Mass., Sept. 30, 1908.
"Remy Electric Company."

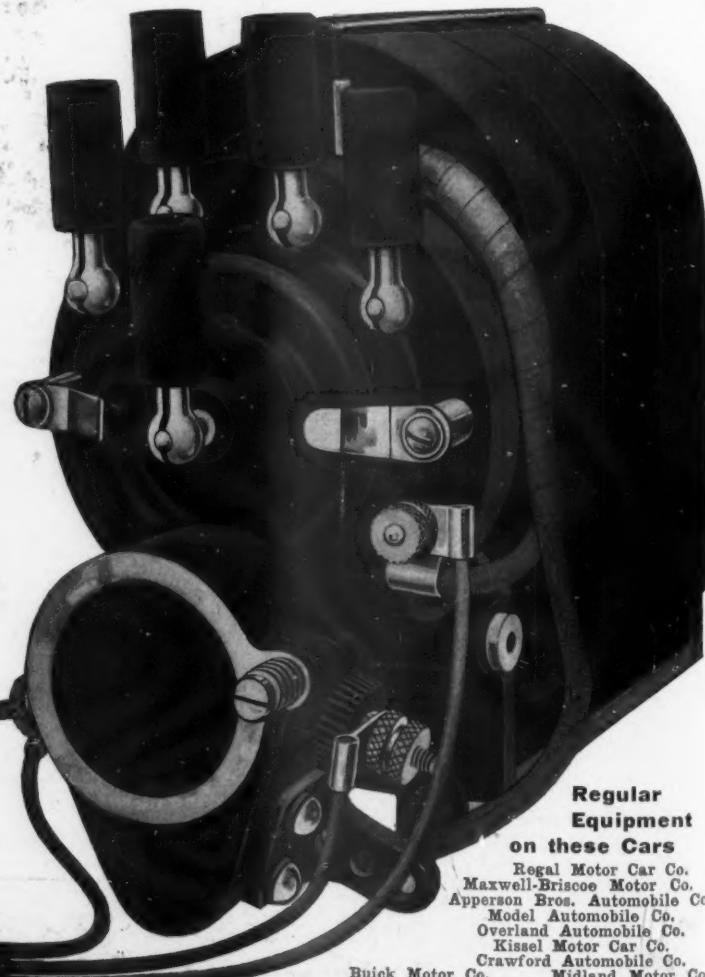
We have recently entered several racing events and our cars, equipped with your ignition apparatus, have all made wonderfully good records.

At Montreal, our Model 5 had captured eight out of nine events, beating Christy and Barney Oldfield's machine and tying for the fastest half mile track in 1:12. This car was equipped with your Magneto and as the report shows, ran faultlessly throughout the several events.

Buick Motor Company,
Boston Branch,
H. K. Hoyes, New England Mgr."

Write us for illustration and full description of our new high tension Magneto. We are building them in such large quantities that we can make you very attractive prices. We furnish fittings for attaching these Magneton to many of the old models of the different American cars.

In the hill climb endurance



Regular Equipment on these Cars

Regal Motor Car Co.
Maxwell-Briscoe Motor Co.
Apperson Bros. Automobile Co.
Model Automobile Co.
Overland Automobile Co.
Kissel Motor Car Co.
Crawford Automobile Co.
Buick Motor Co. Midland Motor Co.
Pope Motor Car Co. Cameron Car Co.
Buckeye Automobile Co. Olds Motor Works.



If there is any one point in relation to automobile motors that influences for good or ill, according as the system is noteworthy or not, it is the ignition. If the carburetor does not work very well it is the ignition system that will disguise the fact if the same is of a high order of merit and in good working order. With a good ignition the mixture will scarcely have to be up to a point of high inflammability, whereas if the ignition is not efficient even good mixtures will ignite with difficulty. Under the circumstances it would be by far better to do without some luxury with the idea of purchasing the best possible ignition devices, which, however, would be to no purpose were they but poorly installed.

That a "dual" system of ignition is well worth having is not to be denied, which is not to say that some parts of the system may not be in common. The practice of using a single timer, for illustration, the same to serve for both the magneto and the coil, is not one to be condemned. On the other hand, there is no objection to separating the systems in such a way as to possess two complete and independent ignition systems. Some of the modern low-priced cars are provided with a magneto in conjunction with a "transformer," battery and timer in common. Certain this is better than the earlier practice, in which a coil and dry battery constituted the whole ignition proposition.

The superior grades of magnetos are rather costly, and it goes without saying that the very low-priced cars can scarcely stand the expense, especially if a dual system is provided. In making a choice it is not far from right in such cases to select a magneto and some means for starting. At all events, the whole situation is much improved over what it was in the past with divers choices for autoists of discernment.

Magnetos Moved Up to First Place—That the magneto is now regarded as of the first importance can be taken for granted, which point is adequately illustrated in numerous of the automobiles to be seen at every hand. In one case the magneto is built into the flywheel, thus becoming a part of the motor as it were. In many of the important products the magneto is regarded as finality, if a dual system is used, and in some cars the magneto is considered adequate for the purpose, irrespective of the fact that a dual system of ignition may be provided. In other words, the time has passed when it will be proper to consider the magneto in the light of an auxiliary to the coil system. It is the coil system that has reverted to second place in the onward march of ignition systems.

If magnetos have advanced in utility, it is equally true that the coil systems have made strides also. In the old days coils were not quite up to a fitting standard, primarily because the bundle of wire in the magnetic circuit was not of a high magnetic permeability. The lag of the spark was not at a constant rate, and the same lag was overmuch. The result was that the regulation of the spark was beyond the ability of the operator of the car, unless at the lower speeds of the motor. Maximum

power of the motor could not be expected under such conditions, nor was it realized within a considerable margin.

The "high tension jump-spark," as compared with the "low tension wipe-spark," it is futile to take space to discuss relatively. The users of both swear by them, and each user backs up his statements with evidence such as cannot be refuted. The probabilities are, both systems being so thoroughly good as to serve well the purpose, it is purely "hair splitting" to discuss the relative merits with a view to finding a difference.

Magnetos have other differences mostly as respects the details of the magnetic circuit, and in placing of the secondary windings as well as the condenser. When reference is had to the quality of the materials in the permanent magnets, there may be differences, since the materials do not all come from the same hole in the ground. As respects the utility of the respective qualities of materials used in the permanent magnets, it is quite another matter to differentiate. It would take a long series of tests to establish the facts, and the cost of the investigation would be out of all proportion to the benefits likely to be derived. In other words, all the materials used are so thoroughly good as to serve well the purpose, and from the point of view of the users of cars it would be a task to try to discriminate. The makers of cars can be relied upon to keep an eye on this phase of the question, since it is to their advantage to see to it that the magnetos they use are provided with permanent magnetos of a stable character. On the whole, the magneto situation is on a very thoroughgoing basis, leaving little to be desired.

Situation in Relation to Coils—The slight reference made to coils was indicative of improvement in the magnetic circuit windings and insulation, and if coils are better in these ways, it is true of them also that they are improved in all ways. Take, for illustration, the "unit trembler," in which any number of coils are under the control of one trembler only. Certainly it is far less trouble to adjust one trembler for several cylinders than it is to try to adjust one trembler for each cylinder. Then, again, there is the scheme in which one coil is used in common for all the cylinders, taking into account a high tension jump-spark distributor, which coil can be with or without a trembler.

In this class of work, if no trembler is used, the timer is so adjusted as to afford a very short period of contact, thus delivering but one spark at a time; and delivering the same at the propitious moment. One good spark at the right time is what is wanted in any case, and any system that will deliver the one "high energy" spark will serve well the intended purpose.

This is not to say that there is any disadvantage in delivering a series of sparks, as in the coil with a trembler, for there can be none. Indeed, if assurance could be had of delivering a series of sparks so timed as to ignite the "mixture"—(a)

at the propitious instant; (b) as many times as possible thereafter—the rate of flame propagation would be greater, and, within limits, it would be an advantage. If no guarantee can be had of delivering a series of sparks on the basis as above outlined, the next best thing is one spark at the right time. Fortunately, the several systems are so thoroughly perfected as to perform their functions to a degree of perfection leaving little to be desired.

There are still to be had the class of coils in which a trembler is used for each coil. Some autoists claim that the compression differs in the respective cylinders enough to demand recognition. In other words, they claim that by adjusting the separate tremblers for the respective coils and cylinders, they realize more uniform results; and they probably do. The only point is, it takes a little more skill than can be expected from a novice, and, besides, it would be possible to adjust compression as well as the spark in a case of this sort. These same autoists set up the contention that absolutely independent ignition systems for each cylinder would be an advantage in case of a break down of any coil. There is a good deal in this, since coils are extremely difficult to repair. On the other hand, it is a fact that of all the equipment in cars, coils seem to hold out the best; indeed, it rarely ever happens that the coils fail in actual service. When they do, it is because of positive abuses and much exposure to the elements under sharp variations in temperature.

Advantages of Various Types of Batteries—The storage battery ranks first because of its higher voltage on open circuit, its lower internal resistance, and its consequent higher "watt" efficiency. Of the storage battery it is also possible to say the actual available energy is considerably higher at a higher rate of discharge. If these are characteristics of storage batteries, it is also true of them that they are "wet" and the "spillage" is diluted sulphuric acid. True, the batteries are very effectually sealed, and the spillage does not amount to anything at all in the cases in which the batteries are accorded a fair measure of attention. If storage batteries are charged at regular intervals, and the electrolyte is maintained at its right strength, they serve well their intended purpose, and well repay the autoist who has the foresight to give them consideration.

Dry batteries are used extensively and in the larger sizes, excepting when they are used as seconds, in which service it is not expected of them to do more than answer to an emergency call. There is no denying the fact that if dry cells are used, it pays to employ the larger sizes. They last far longer and during their life they afford a better result, since the internal resistance is lower and the amount of depolarizer is in far greater excess. It is now possible to purchase batteries of the "dry" variety in boxes of great utility, so arranged that the connections are made automatically.

As between the two types of battery, choice depends upon the point of view. If one cannot have the storage battery charged at regular intervals, it is a waste of money to buy it, in which event the dry battery has many points of superiority. If the coil is economical, the dry battery serves very well in any case. If the battery is for emergency work only, the dry battery will do.

Besides storage and dry batteries, there are primary batteries that should have a place in this class of work. They are good current givers, and the replacement of the "charge" is attended with little or no difficulty. These batteries are of the "wet" description, and on that account may not be preferred by some. To seal them should not be a great task; sealing is effectual in the storage battery work. The difference between a primary and a storage (secondary) battery lies in the fact that with the primary battery the elements are wasted away, and have to be replaced when they give out. In a secondary (storage) battery, the elements do not give out during the natural life, and to recuperate the battery it is but necessary to recharge the same.

Battery boxes are to be had in wood, highly finished, and in pressed steel; under lock and key, if desired. They are made in a variety of sizes to fit on the running-board or under the seats. Batteries are made in certain sizes, and the makers of boxes have taken this fact into account. This automatic coöperation has resulted in the lowest possible first cost, quick deliveries, and the highest possible quality of the respective products.

Something About Chemicals Used in Batteries—Storage batteries are provided with a solution of sulphuric acid in distilled water. The strength of the same is 25 degrees Baumé. The water must be distilled in a tin-lined equipment and must be free from iron, chlorine, nitrates, mercury, copper, arsenic, and such other ingredients as might introduce undesirable chemical action. A storage battery will last for a long time if it is not allowed to become contaminated by some one of the elements or compounds such as will induce chemical action. There is nothing that will so quickly reduce a battery to a useless state as iron, chlorine, or nitrates. Any of these ingredients can come from the water or from the surroundings. Electrolyte can be purchased from the chemists, guaranteed pure and of the right strength.

Dry batteries do not have to be replenished unless they are allowed to dry out, in which event it is possible to recuperate them by spilling water into them, in which water a little sal ammoniac will serve a useful purpose. Primary batteries may require caustic soda or what not, depending upon how they are made. In any event, it is desirable to use pure chemicals from a reliable source.

Electrical Conductors, Terminals and Fastenings—However good a coil or a magneto may be, it is of no practical avail if the insulation on the secondary winding is below the requirements. It is not far from right to claim that the electromotive force in the secondary circuit of a modern "transformer" will reach the enormous instantaneous value of even 40,000 volts. The wave is an irregular saw-tooth, and the electrostatic strain is so very great as to require an extra thickness of the finest insulation to sustain under such conditions. It is a simple waste of time to use anything but the superior grades of insulated wire in secondary circuits, and the manner in which the terminals are made up is a matter of some moment. Fortunately, suitable grades of insulated wire are to be had and builders of automobiles are alive to the needs of the service. In repair work, or in going over a car, it is not unusual to see repairmen make splices in the wiring. The secondary wires should not be spliced, because it is not easy, if possible, to maintain the high insulation resistance of the wire that should and does obtain when the insulation is new and not spliced.

The primary wiring does not have to transmit high electrical pressures, but the joints have to be good because the voltage is low. With a low voltage, if a joint is not good the resistance becomes so great as to defeat the aim. Terminal connectors should be used, and in every possible case the joints should be soldered. There are divers forms of terminal connectors to be had; they all answer the purpose to a greater or less degree, and none of them is so inferior as to warrant going back to the simple expedient of twisting the bare wire around the terminal screw.

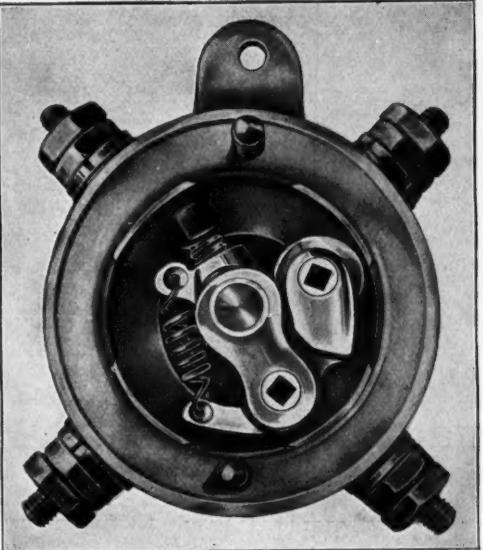
Of Spark Plugs There Are a Plenty—The spark plug situation is in good shape, with a considerable selection at the disposal of the autoist. The underlying idea is the same in most of them, but there are considerable differences in point of detail. Of insulators, there are the porcelain tubes on the one hand, and mica on the other. Porcelain is so much improved in modern spark plugs as to give almost no trouble at all, while mica if it is well selected and nicely put together, will last for a very long time. The details of finish of spark plugs are much more refined than they were in the past, and the question of the standardization of the thread in the cylinders is receiving a due measure of attention.

TIMERS AND DISTRIBUTORS

Of Every Known Type for Every Known Service

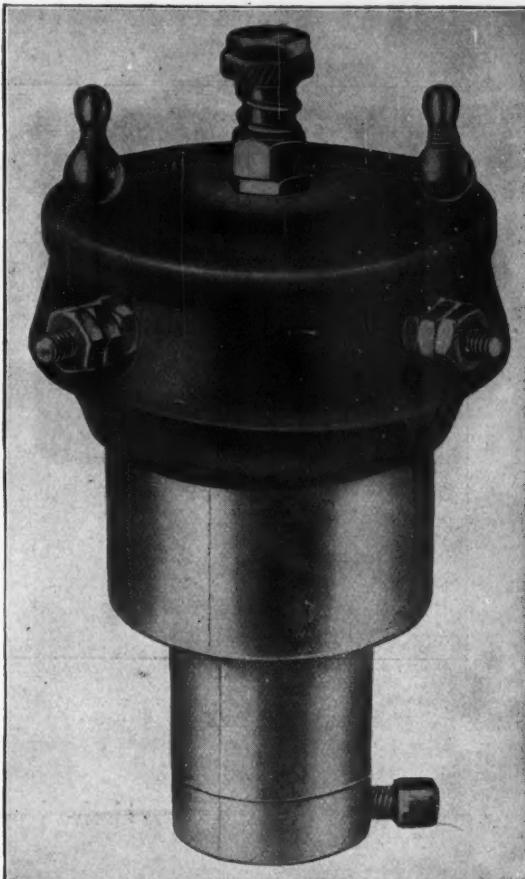
We are specialists in this line and our experience and machine equipment enable us to turn out large quantities for engine manufacturers and dealers at very attractive prices. We do not attempt to describe all models on this page but present a few

of established popularity and known merit. If manufacturers do not find here listed types which will readily meet their particular requirements, we would be glad to receive their own specifications or enter into consultation with a view to producing a design best suited for the service intended.



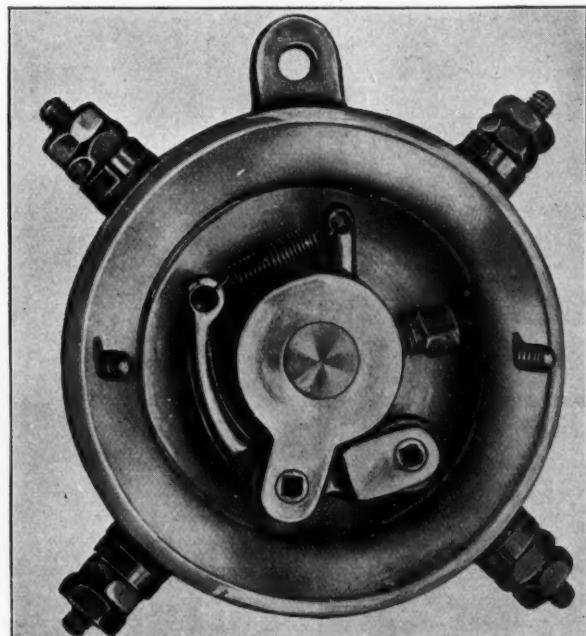
Elite Timer

Designed to meet a demand for a small roller type. $2\frac{1}{2}$ in. diameter. Made with either plain or ball bearing spindle. Suitable for Ford, Buick and other runabouts. Prices on application.



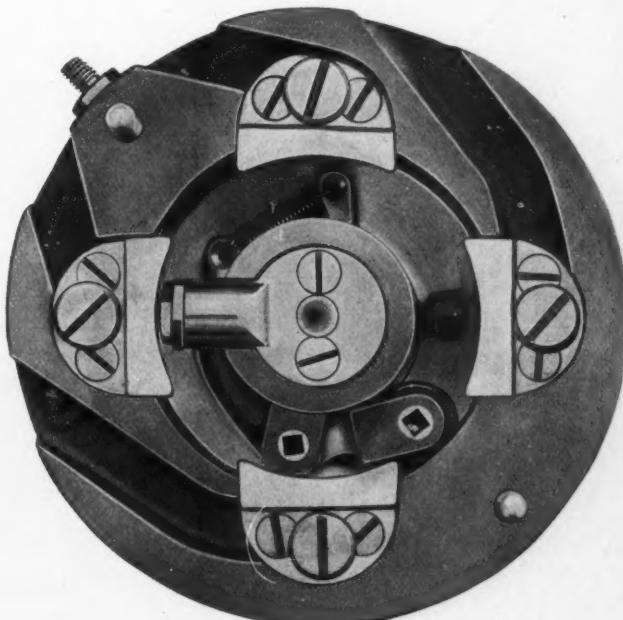
Elite Distributor

An efficient, compact distributor for small runabouts at a popular price. $2\frac{3}{4}$ in. diameter. Prices on application.



DeLuxe Timer

This is standard in every respect. Size, design, workmanship and finish. Made in various styles to meet special requirements. Stock size $3\frac{1}{4}$ inches diameter. Prices on application.

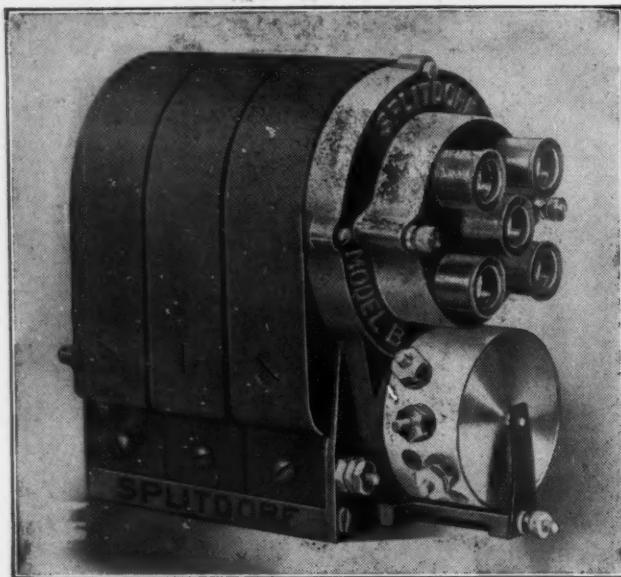


DeLuxe Distributor

Those who desire efficiency and refinement will note in this model a combination of distinctive features not yet equaled in any similar device. Prices on application.

THE ALTEMUS MANUFACTURING COMPANY, Engineering Machinists
42d and Chestnut Sts., Philadelphia, Pa.

The Best Magneto Investment



is a

SPLITDORF

Not merely because it is made by the oldest and largest ignition specialty firm in America, but because of its real value as a Magneto.

The motoring public recognize that the creative genius exercised and the infinite pains expended in SPLITDORF construction demand a somewhat higher price, but in proportion to value received the SPLITDORF is

The Most Moderate-Priced Magneto in Existence

Once and for all it is the best that money will buy.
Fifty years of electrical engineering experience behind it.

Every part of this superb mechanism is of the most excellent material, and the construction is by the highest skill obtainable in America, embodying in every detail the most important improvement known in Magneto building. Its simplicity enables the inexperienced to install and adjust it without losing any of its efficiency. We emphatically claim it is the Most Scientific in Design, the Most Effectual in Operation, the Most Carefully Built of any Magneto extant.

Be sure to specify the SPLITDORF MAGNETO for your 1909 car. Being thus equipped, you will be assured faultless ignition every day in the year.

Get our Magneto catalog for detailed description.

See our Exhibit at the Grand Central Palace Show—Space 107K

C. F. SPLITDORF

Walton Ave. and 138th Street

Branch, 1679 Broadway

NEW YORK

Chicago
319 Michigan Ave.

Detroit
886 Woodward Ave.

Boston, Motor Mart
220 Pleasant St.

San Francisco
520 Van Ness Ave.

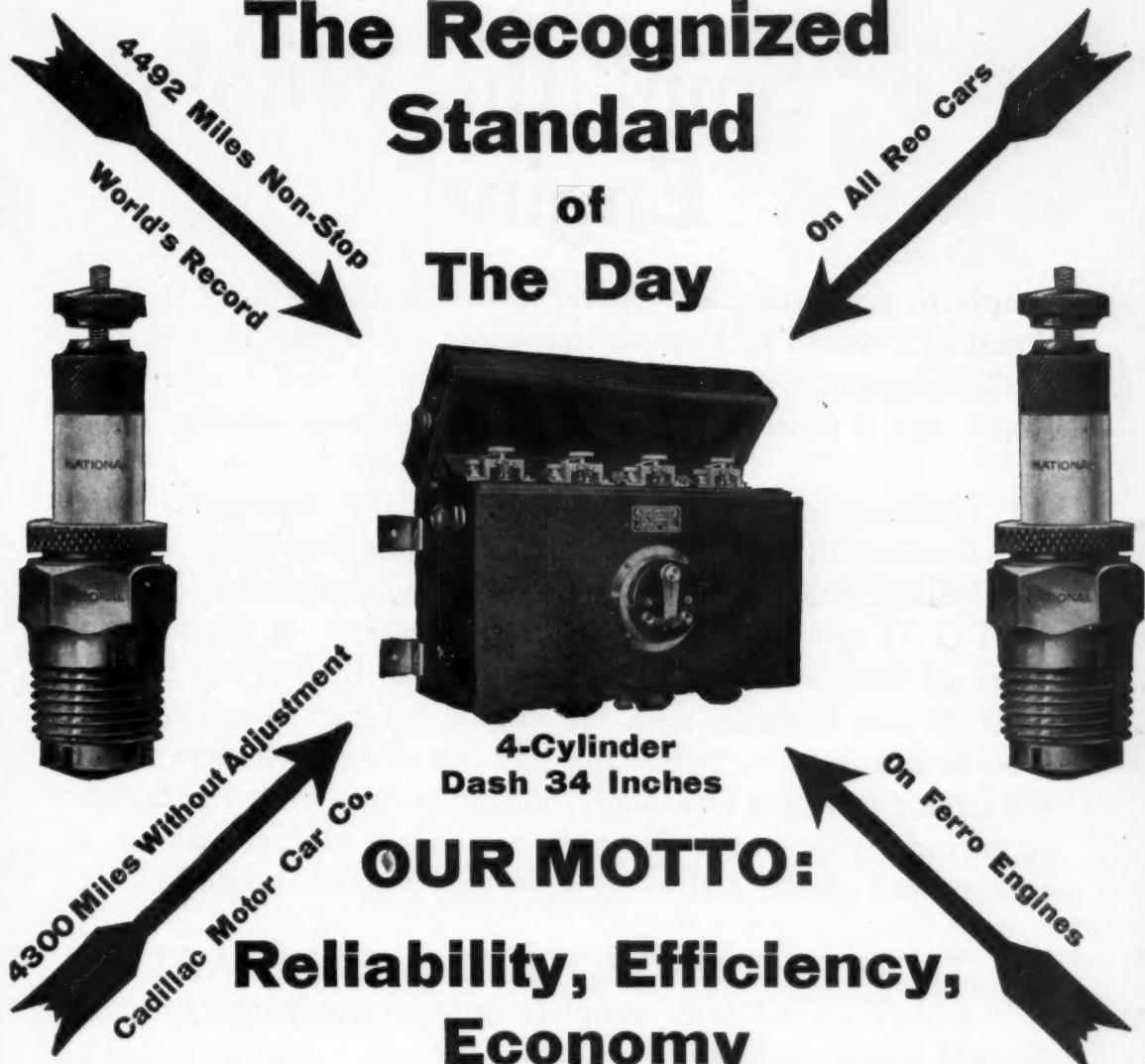
NATIONAL COILS, PLUGS and MAGNETOS

are

**The Recognized
Standard**

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Use National Coils, Plugs and Magnets

SEE! NATIONAL EQUIPMENT DISPLAY AT
THE NEW YORK AND CHICAGO SHOWS

NATIONAL COIL COMPANY, Lansing, Mich., U.S.A.

Send for our 1909 Catalog

The MAGNETO That Never Needs Spinning

To "Spin" the Whole Engine

simply to get a sufficient spark from the magneto, is as irrational as it would be to push the whole car to start the engine. If the magneto were disconnected you could spin it with one finger, but it takes a strong man to spin a large engine.

C Nothing is more certain than that the magneto of the future will be free from this irritating handicap. The UNTERBERG & HELMLE SELF-STARTING MAGNETO (Type LE) is free from it **to-day**. It produces a spark of high intensity on the slowest half turn of the crank. You do not have to spin the engine to start from "cold." You do not have to pump the gas out of the cylinders when the engine is warm and take your chance on what the carburetor may give you. You do not have to carry along a battery and special coil to do what the magneto **ought** to do.

C The UNTERBERG & HELMLE SELF-STARTING MAGNETO is a complete ignition equipment in itself for **all** speeds and **all** conditions.

C For 4-cylinder motors up to 35 h.p., the new type CB-4 embodies some interesting features. Look for it at the Shows.

J.S. BRETZ COMPANY
Sole Importers, Times Bldg, New York

BUYING IGNITION MATERIAL IS A MATTER OF CONFIDENCE

HERZ IGNITION MATERIAL HAS BEEN THE **BEST** THESE LAST 15 YEARS. NO EXPERIMENTS.



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THE ONE ALWAYS DEPENDABLE and RELIABLE CIRCUIT BREAKER. TOOL STEEL vs. TOOL STEEL. NO LOOK-ING-AFTER. NO RE-PAIRS. OVER 100,000 IN CONSTANT USE. SAVES 25 PER CENT ON GASOLINE. RUNS PACKED WITH GREASE. SEE THE 12 DIFFERENT TYPES AT THE SHOWS.

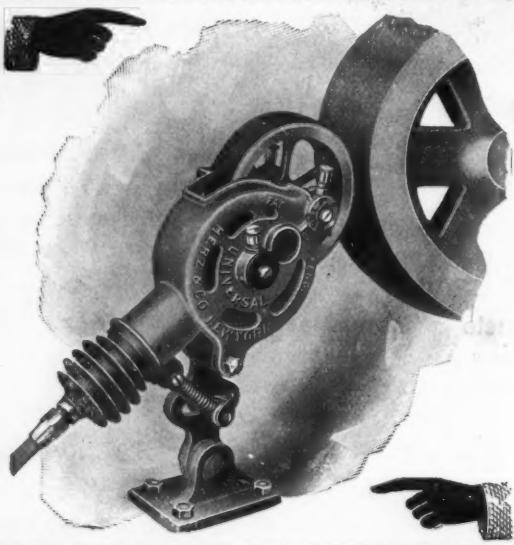


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The Smallest, Most Compact Instrument Made. With a Single Coil and 4 Plugs, it Gives the Most Complete and Reliable Ignition Outfit. Double Ball Bearing. Spring Ball Connections. No Experiment. A Tried Out Device. The Ideal Outfit for Double Ignition, 2, 3, 4, 6 Cylinders.

"UNIVERSAL"

A FRICTION DRIVEN POWER PUMP. GEARED DOWN. SOLE LEATHER COVERED FRICTION WHEEL. AUTOMATIC INLET, BALL DELIVERY VALVE.



"UNIVERSAL"

PISTON RINGS, NO LEATHER, PUMPS UP TIRES, PUMPS UP TANKS ON POWER BOATS. PRICE \$20 WITH BRACKETS.



HERZ'S PATENT HAND LEVER FRICTION PUMP "TANDEM"

Ten Years Ahead in Pump Construction.

To SEE it means to BUY it. An absolutely reliable Power-Pump, kept in your toolbox. Piston Rings made to last. Driven by friction from the flywheel or any other part of car. Pumps up the largest tire in from 3 to 5 minutes.

New
Improved Pattern.

Price,
\$20.00.

SEE THE
HERZ MAGNETO
AT THE SHOWS
A Revolution and A Revelation!

HERZ & CO. CIVIL ENGINEERS NEW YORK.

Write for Our "Handbook of Ignition"—Free.

The best value in SPARK PLUGS ever offered.

Post-paid
everywhere,
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Largest Stock of
ASBESTOS-
COPPER
GASKETS
in America.
1200 Sizes.



HERZ - PLUG

"Bougie Mercedes"

The best and most reliable Plug made. The DOUBLE - STONE INSULATION alone puts it into a class far above the best porcelain Plug. Porcelain cracks—this Stone never.

ABSOLUTELY GUARANTEED for one year. Absolutely self-cleaning.

Absolutely proof against soot or oil. Needs never be taken out of motor.

KINGSTON



**SPARK COILS
SPARK PLUGS
TIMERS**



**Larger Output—Lower Cost for 1909
1,000 COILS A DAY**

Will be our capacity for the next year. This immense output means great reductions in cost of manufacture and a still greater reduction of the selling cost, since every sale of KINGSTON goods sells more without any expense—the high quality of our goods makes friends everywhere—to try them is to use them and to use them once is to use them regularly. The great reduction in cost of production, together with economy in selling end, entitles the user to greatly reduced prices; therefore a new list price for 1909 has been arranged, showing greatly reduced prices on the entire line of KINGSTON IGNITION SPECIALTIES.

The KINGSTON line includes Spark Coils for every purpose; Dash Coils; Plain Box Coils; Magneto Coils, specially fast; Motorcycle Coils; Make-and-Break Coils; Mica Spark Plugs, and Timers, all high grade, but at prices based on a reasonable manufacturing cost. The

**KINGSTON Line is RIGHT
High Grade
Reasonable in Price**



It is easier to sell a high grade article at a fair price than a high grade article at a high price or a low grade article at any price.

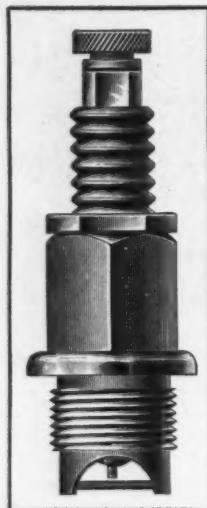
We want live dealers in every city and town to handle our goods. Write for new quotations and full information. Booklet descriptive of the entire line for the asking.



SEE OUR EXHIBITS New York: Dec. 31-Jan. 7, Grand Central Palace, Space 154
 New York: Jan. 16-23, Madison Square Garden, Space 157
 Chicago: Feb. 6-13, Coliseum Gallery, Space 75

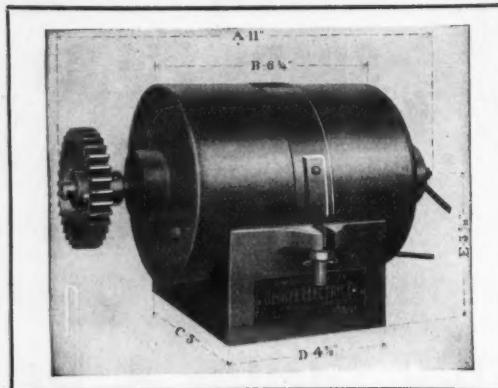
KOKOMO ELECTRIC CO. P. O. BOX 207 Kokomo, Ind.

HEINZE IGNITION APPARATUS



HEINZE
IMPROVED
MICA
SPARK
PLUGS

Standard A. L. A. M. 7-8
inch 18 thread



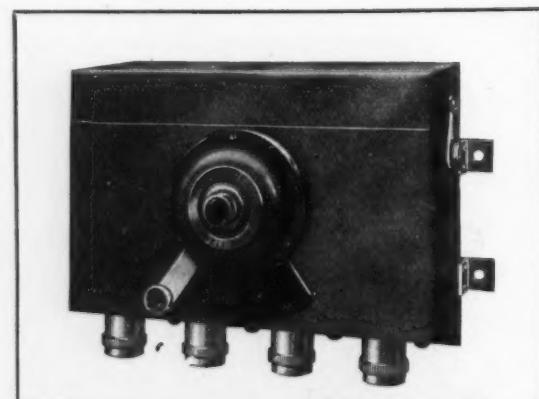
Heinze Low Tension Magneto operating through vibrat-
ing coil to spark plug



Regular 1-2 inch-14
Pipe thread



Showing Magneto Disassembled



Our latest type coil supplied with kick switch for operating
either on Magneto or Battery



Our latest type of timer with our improved wiper contact,
acknowledged by all leading Motor Car Makers to be the
most superior type of construction

Send for our latest Catalogue

Heinze Electric Company

Factory and Main Office

LOWELL, MASS.

Ignition Reliability

is, in the last analysis, simply the ability to *keep going*, coupled with ease of repair and adjustment when wear occurs.

But how long should it "keep going"; and what degree of ease in repair is requisite? The standard of ignition reliability in the past has been very moderate; and to spend an hour or two a week on the various ignition elements has not seemed unreasonable.

The time is coming when the ignition system will be required, in any reputable car, to do its work with as much uniformity, as little demand for tinkering, adjustment, and expert skill, as the valves or the ball bearings.

That is the sort of reliability which users of the Atwater Kent Spark Generator are learning to expect of *their* ignition system—and they are getting it.

The Atwater Kent Spark Generator is a high-tension ignition apparatus for multi-cylinder engines. It has a positive mechanical make-and-break so designed as to run for years without appreciable wear. The moving parts are exceedingly light, and are glass-hard. One spark is made per ignition, and the duration of contact—regardless of the engine speed—is as short as will permit the coil to "build up." Six dry cells last 1,500 to 2,000 miles. The coil, distributor, spark advance, and cylinder cut-outs are as carefully worked out as the contact maker.

Atwater Kent Manufacturing Works

50 NORTH SIXTH ST.
PHILADELPHIA, PA.

EISEMANN MAGNETO



The **Eisemann Magnets** have reached the highest degree of perfection, outclassing all competitors.

You can run your motor at slower and at higher speed on the **Eisemann Magneto** than any other, and with an absolute certainty of a full development of the possibilities of your motor. The **Eisemann** requires practically no attention and is always ready to give you the very best results.

See Us At the Shows
NEW YORK and CHICAGO

An examination of the records will show that the **Eisemann** was equipped upon the winners of the principal motor racing events of the last three years.

You can not make a mistake if you equip with **Eisemann**. Various models for any and all kinds and sizes of motors. Give us the specifications of your motor and we will advise you just what you need.

Lavalette & Company

112 West 42d Street

-:::-

New York City

A Year of Triumph for Bosch Magneto

ON THE TRACK

Bosch won the French Grand Prix. The Prince Henry Contest. The Grand Prize at Savannah. The Light Car Event at Savannah. Both Brighton Twenty-Four Hour Races. Nazarro established the World's Record (120 miles an hour) with a Bosch. Many minor track events were also won with this system.

ON THE ROAD

The Thomas car won the New York-Paris Race with a Bosch. The winning cars in the A. A. A. Touring Contest were equipped with a Bosch. T. K. Hastings completed the Six Day Reliability Trial (Auto Cycle Union of England) with a Bosch.

IN THE AIR

Zeppelin's great Dirigible Airship used two Daimler Motor Engines equipped with a Bosch.

ON THE WATER

Dixie II, winner of the International Trophy in the greatest Motor Boat Race of the year, was equipped with a Bosch.

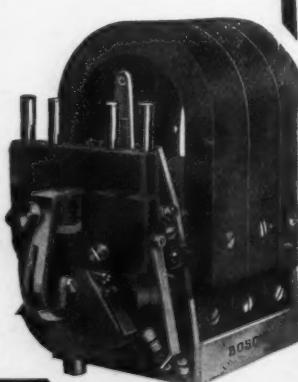
ON THE MARKET

The Bosch is recognized as the Best Ignition System obtainable, and it is found on the majority of cars all over the world. Order a Bosch NOW for your car!

**BOSCH
MAGNETO
COMPANY**

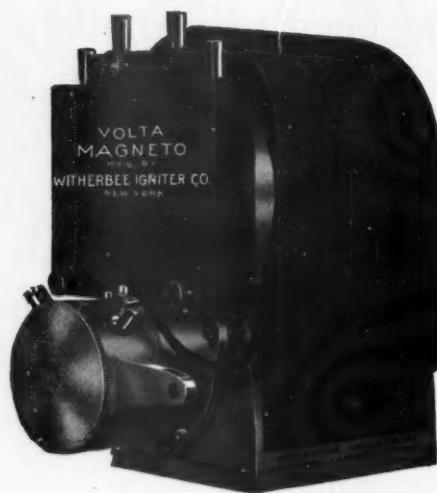
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West 46th St.
NEW YORK

CHICAGO BRANCH
1253 Michigan Avenue



HIGH TENSION

=VOLTA=



THE GUARANTEED MAGNETO

We guarantee the Volta magneto as a perfect ignition system in itself, and we expect the user to hold us absolutely to our word. In efficiency, simplicity and accessibility the Volta stands alone.

Witherbee for Ignition

Wico Charging Device, Wico Ignition Wire, Wico Spark Plugs, Witherbee Batteries, Wico Inspection Lamp.

WITHERBEE IGNITER CO.

1876 Broadway, NEW YORK

Makers of the Famous Witherbee Battery

Chicago: 1429 Michigan Ave. Detroit: 220 Jefferson Ave.
Buffalo: 43 East Eagle St. Baltimore Office: 604 Continental Bldg.

"You Screw the Battery In—We've Done the Rest"

Patterson Wireless Dry Battery Holder

ADMITTEDLY the BEST Battery Equipment for a Car, BECAUSE

- 1st—NO BINDING POSTS OR WIRES—setting up or renewal of battery as easy as an incandescent lamp—in fact, done in the same way!
- 2d—CONNECTIONS CANNOT JAR LOOSE! Contacts positive and instantly made!
- 3d—Moulded rubber composition plate over rubber gasket waterproofs batteries absolutely
- 4th—Automatic bridge in each receptacle permits removal of an exhausted cell without interrupting circuit.

YOU'LL NOT BOTHER WITH STORAGE BATTERIES after you've seen this battery set.It's IDEAL. Each unit renewable even with your gloves on. The most-talked-of invention in the electrical field! Send for Bulletin No. 63**STANLEY & PATTERSON, 23 MURRAY STREET New York**

COLUMBIA, "EASTERN," "NUNGUSSE 1900," "STACKPOLE," "RED SEAL," "HI-UP," "MESCO" and other makes of Batteries now furnished in this

"Screw Top" Pattern. Just specify "SCREW TOP" in place of old Binding Post type of Cell.



Mahogany Battery Box



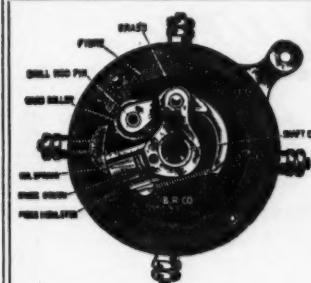
Any Voltage or Amperage Desired

We Want Your Decision

whether the VOLKCAR IGNITER STORAGE BATTERY is the best on earth. Use it sixty days and if you are not satisfied in every particular return the battery and we will refund your money.

Our 6-volt, 60-ampere hour battery will cost you \$18.90 and is fully guaranteed for two years.

CARPENTER & VOLKHARDT
2441 Michigan Ave.
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SAMPLES PREPAID

1 cyl....\$ 9.00 2 cyl....\$ 9.50
4 cyl.... 10.00 6 cyl.... 14.00

THE BECKLEY-RALSTON COMPANY
88 MICHIGAN AVENUE, - CHICAGO

MAXIMUS SELF CLEANING TIMER

Increases speed and power of engine. Reduces consumption of gasoline. Stops spark plug trouble. The self-cleaning device (patent allowed) does this by keeping segments bright and free from all deposits, thus insuring a positive contact.

30 DAYS' TRIAL

Fully guaranteed, and in addition we will agree on sample orders to refund purchase price if article is not satisfactory or does not do what we say, and is returned at any time within 30 days.

BUICK SPECIAL

A special timer for Buick cars is ready subject to regular guarantee and to above trial offer. If you have had timer trouble, "Try a Maximus."

Send for General Catalog of Supplies.



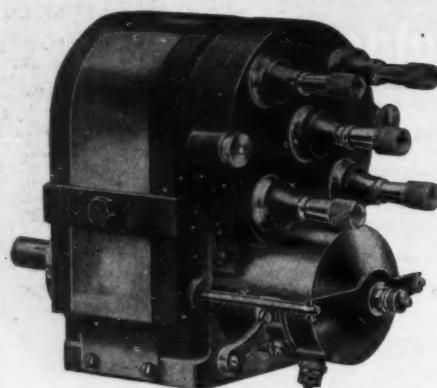
CONNECTIGUT

If it's a COIL (1, 2, 3, 4 or 6 Cylinder) Distributor, Timer, Terminal, Coil Current Indicator, Ammeter Switch or Exploring Lamp, we have them in Quality, a little better than the best.

SEND FOR CATALOGUE 13-A

CONNECTIGUT TEL. AND ELECTRIC COMPANY, INC. 90 Britannia Street **MERIDEN, CONN.**





**Announcement to
Manufacturers**
LATEST!
BEST!
CHEAPEST!

Kurtz

HIGH TENSION MAGNETO

At the request of the Hess-Bright Mfg. Co. we have changed the name of our Magneto from Hess to Kurtz.

LATEST—Because it is.

BEST—Because we can produce a *hotter* spark at a *lower* speed. Our armature has *improvements* not found on any other Magneto. Has *one-third* less parts than any other Magneto, which means simplicity and of course increases reliability. Constructed under our *original* patents, by which method we can reduce the number of parts as well as increase the efficiency.

CHEAPEST—Because it stands higher in efficiency and reliability. We can *afford* to sell cheaper not by giving you something inferior, but can do it only by using our *patented construction*, and reducing the parts and complications to a minimum.

We have the largest line of Magnetos on the market. We *actually sold more* Magnetos for 1908 than any other concern. A strictly American product, guaranteed to have the efficiency and quality of the best on the market.

We are offering nothing freakish. Built on established principles. Efficiency and durability our one aim.

HERCULES goods sold absolutely on their merits. Write Dept. "M. A."

HERCULES ELECTRIC COMPANY
INDIANAPOLIS :: :: :: INDIANA, U. S. A.

Are you figuring on some
CABINET WORK

We make the boxes for the leading spark coils. The quality of our work is the highest and our prices are right
FRANK A. MARON 320 Pearl Street NEW YORK



**THE
"INVINCIBLE"
Ignition Storage Battery**
Send for instructive Catalogue and Price List

American Battery Company
165 S. Clinton St., CHICAGO
Established 1889

**THE MOSLER
SPIT FIRE SPARK
PLUGS**
ARE THE BEST
A. R. MOSLER & CO.
163 West 29th Street, New York City

We announce the "APLCO" perfected Dynamo-Floating Storage Battery Ignition and Lighting System for Automobile, Motor Boat and Stationary Engine.

WIRING DIAGRAM FOR APLCO DYNAMO-FLOATING-STORAGE-BATTERY-IGNITION-SYSTEM



Specify and pay the difference for an "Aplico" system on your next automobile, motor boat or stationary engine and it will pay a handsome interest on the investment.

Send for bulletin No. 3 giving prices and complete information.

We will demonstrate this system at Booth 217, Madison Square Garden, January 16th to 23d.

APPLE ELECTRIC CO., 16 N. CANAL ST., DAYTON, O.

SIMPLICITY RECTIFIER
for Charging Ignition Batteries From
an Alternating Current

Durable
Compact
Efficient



Simple
Safe
Fireproof.

THE AUTO & SUPPLY MFG. CO.
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GEISZLER Storage Battery

NON-SULPHATING
8 Volt, 60 Ampere Hour
Price, \$15.00
Guaranteed for one year. Send for Catalog B.

GEISZLER BROS.
514 W. 57th St., New York City

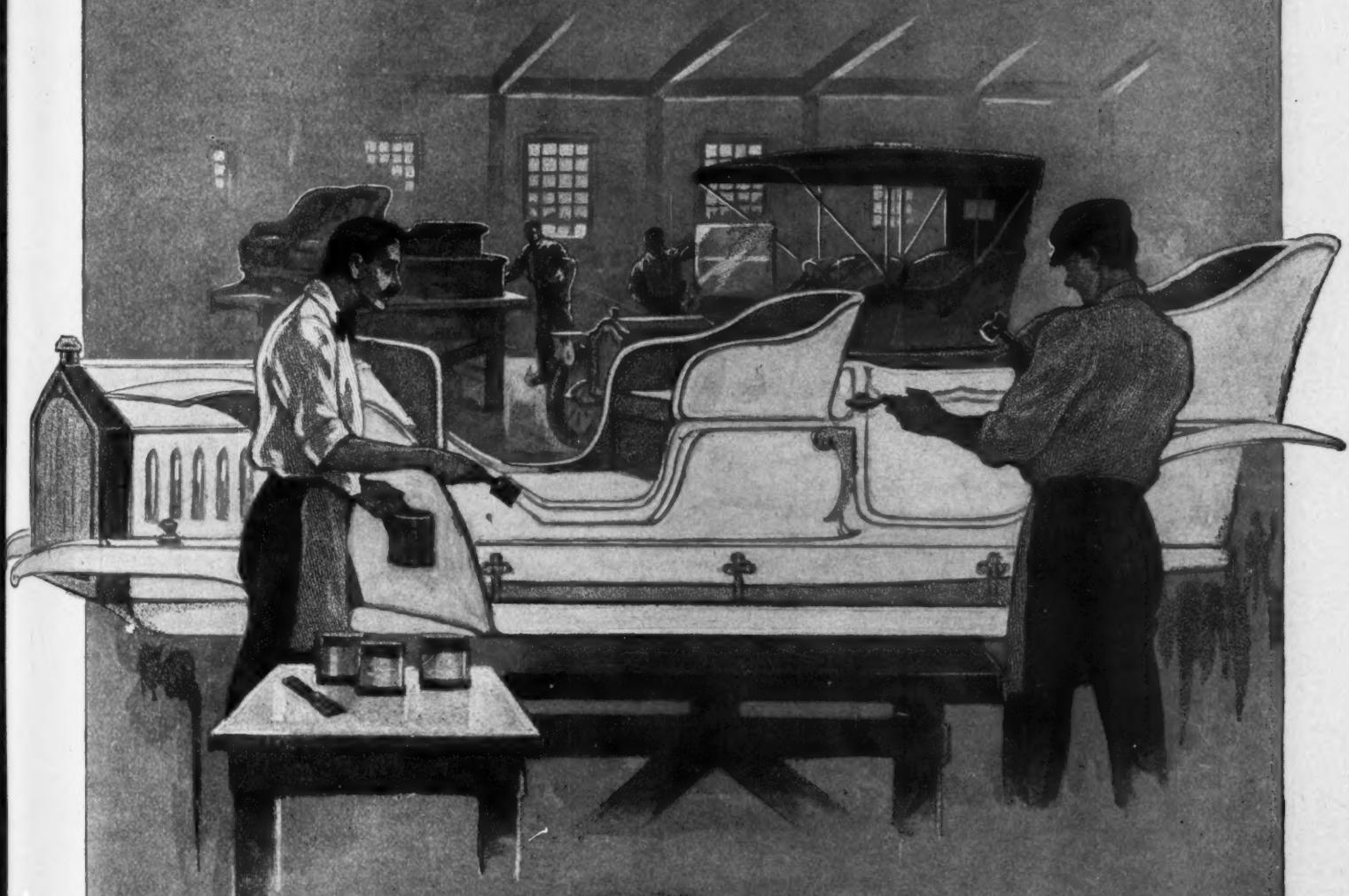
The "Gotham" STA-RITE will end your spark plug troubles. Soot can't stick to the porcelain. Won't short-circuit. Never leaks. Can be taken apart and cleaned with ease. Of dealers. Or direct, \$1.00.

THE R. E. HARDY COMPANY
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Packard
Customers are our
advertisers
Unexcelled
quality is
our motto
PACKARD CASTLE
THE PACKARD ELECTRIC CO., Warren, Ohio

**MOTOR AGE ADS.
BRING RESULTS**

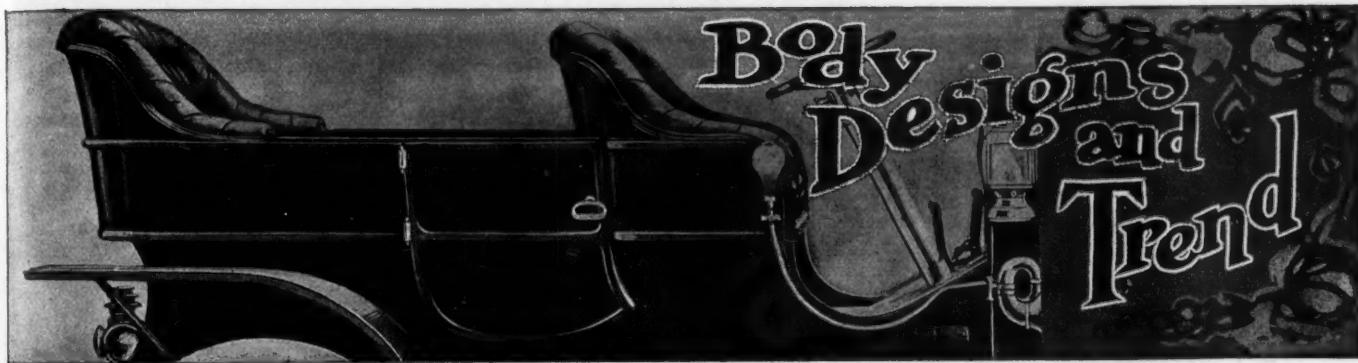
Body Section



INCLUDING

Tops, Mud Guards, Upholstery, Paints, Varnishes, and
Other Finishing Materials, etc.

MASURY
SUPERFINE
AUTOMOBILE COLORS
ALL COLORS
AND
VARNISHES
BRILLIANT FINISH
MANUFACTURED BY
JOHN W. MASURY & SON
NEW YORK
CHICAGO - ST. LOUIS - MINNEAPOLIS
ESTABLISHED 1835



FROM the rear entrance tonneau to the elaborate creations of two or three years ago were as echoes from abroad. The makers of bodies in America ultimately reached the conclusion that utility and stability ought to have something to do with the project. The side entrance is an American idea, but it did not reach the point of its full significance until American designers interjected a little common sense. The swanlike curves and fantastic configuration so dominant in the late creations have given way to straight line work, comfortable seats, and the requisite amount of foot room.

In bodies of the past the distance from the top of the cushions to the deck ranged from 16 to 18 inches, while in bodies of the present time the average distance is scarcely more than half of the value above given. In the earlier types of bodies the distance from the seat panel to the dash, or between seats, as the case might be, ranged around 20 inches, while in modern work the minimum distance is about 25 inches. In the old days, when designers wanted to know how high to make the seats, they measured the height of a chair from the floor, while in the new bodies they took into account their experience in automobiles. In the course of time it dawned on designers of bodies that racing drivers insisted upon seats very close to the deck, and they seemed to be able to maintain their positions under strenuous conditions for hours at a time, whereas autoists perched high in the seat were much fatigued in a hundred miles of travel. The influence of racing is to be seen in bodies at every hand.

The Several Types of Bodies Extant—Runabouts, roadsters, five-passenger touring, seven-passenger touring, limousine, brougham, victoria, landaulet, cabriolet, surrey, taxicab, and the types of commercial bodies, as delivery and truck. From the runabout to the seven-passenger touring car, inclusive, the bodies are practically all straight-line effect, and special mention should be made of a comparatively new type of body known as the "close-couple," in which a rumble seat is placed over the rear axle and behind the rear seat proper, thus affording seating capacity for six in cars of a wheelbase length to take a seven-passenger touring body. In the close-couple design the idea is to afford a place for the chauffeur during the time when the owner holds the wheel, and thus the owner is allowed the pleasure of driving the car and greater privacy is offered the party by seating the chauffeur in the rumble seat. This close-couple body has other advantages, among which it might be mentioned that the occupants of the rear seat within the body proper will not be jolted to anything like the same extent as they would be were the rear seat located over the rear axle.

With a view to the greatest possible convenience, numerous of the runabout types of bodies are provided with a folding or rumble seat on top of the tool box in the space available at the back. The little cars are, therefore, more commodious, and they certainly present a better appearance.

Offerings in Runabout Types—Numerous of the runabout types of bodies are provided with a folding or rumble seat on top of the tool box in the space available at the back. The little cars are, therefore, more commodious, and they certainly present a better appearance, eliminating the "dinky" effects

so abhorrent to owners of small cars. These bodies are, of course, prototypes to a smaller scale of the roadster type of bodies to be seen at every hand.

The builders of cars now consider the body question and the space needed to a far greater extent than they did in the past, and in side entrance cars the width of the entrance is generally about 22 inches, far enough towards the front to permit the door to be opened wide without interfering with the rear mud guards. In the shaft drive types of cars the sprocket wheel fender is absent and the side entrance is unobstructed. These improvements naturally indicate an increased wheelbase over cars in the past, and the new drop frame idea has permitted the body makers to drop the sills of the side entrances in the average about six inches, without interfering with the spring play, which is about five inches in the good example of cars.

Town Car Body Work—In town car bodies and bodies for taxicabs, the driver's foot room is reduced to the minimum. The motors are made as short as possible, and the wheelbase is made within a hundred inches, yet even so the side entrance is provided with a wide door and the space for the occupants is roomy, with spacious seats, while easy riding qualities are assured through having the seat to the front of the rear axle.

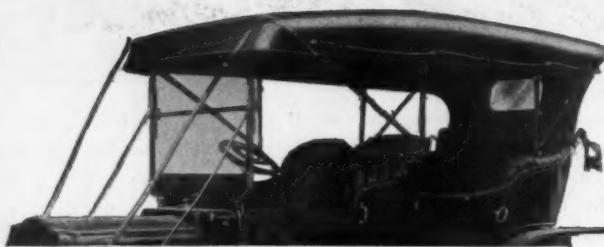
When reference is had to artistic effect and distinctive elegance, it would be a fallacy to assume that the straight line types of bodies are at the expense of art, and while it is impossible to say that art cannot exist without utility, it is a fair assumption that utility does not exist to the despair of art. These requisites can reside in harmony, and they do. The modern body maker has solved this difficult problem, and it will not be possible to charge him with spreading out too thin because he has made a residence for symmetry in all the cars from the runabout type to the most luxurious types of town cars.

Materials Used in Body Work—These have changed but little in the last two or three years, unless it is to note a more extended use of sheet steel. In some cases this sheet steel is aluminum coated or otherwise suitably protected as against the formation of oxides. At all events, metal bodies are looked upon with much favor; they are very prevalent, and aluminum is still used extensively. The framing work is invariably of wood and the center of gravity is held extremely low. Coming down to the finish proper, there are two fundamental ideas, one of which takes into account painting along lines consistent with machinery practices in which pure lead and zinc ground in pure linseed oil form the basis, while the effects are due to color. If more than the natural luster is desired in this class of finished work, the requisite quantity of varnish is added. A high finish can result from this practice, and bodies so treated will stand a vast amount of washing and rough usage.

For the more costly types of bodies in which the finish is to be the limit of the carriage maker's art, the old standard practice is maintained, stopping off at from 18 to 21 separate applications of finish. The upholstery in the better class of bodies is in hand buff leather of the best selections, with occasional examples in suitable cloth fabrics, notably in town cars. For the less expensive types of cars machine buff cowhide obtains.

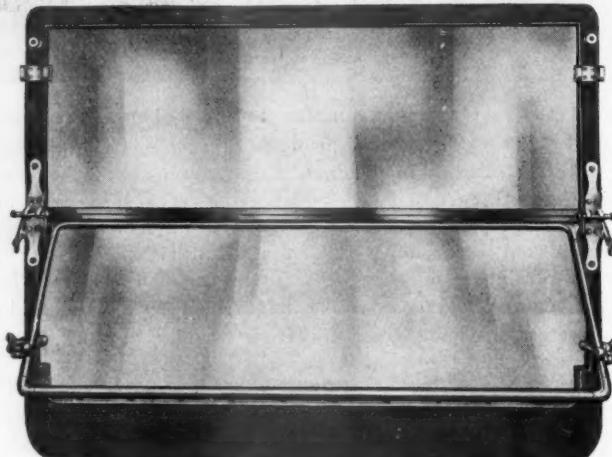
London

CREATIONS in AUTO TOPS and GLASS FRONTS



1909 Style London Top, equipped with Bow Separators, Murphy Fasteners and Vizor to go out over glass front

Embody the BEST and LATEST constructions. For all exacting motor car owners. STYLE, QUALITY, DURABILITY and CONVENIENCE unexcelled. Insist on LONDON TOPS and FRONTS when ordering your equipment.



New Ventilating Wind Shield. Allows fresh air at all times and no direct draft in any part of car.

WRITE FOR ILLUSTRATED CATALOG GIVING FULL PARTICULARS

London Auto Supply Co.

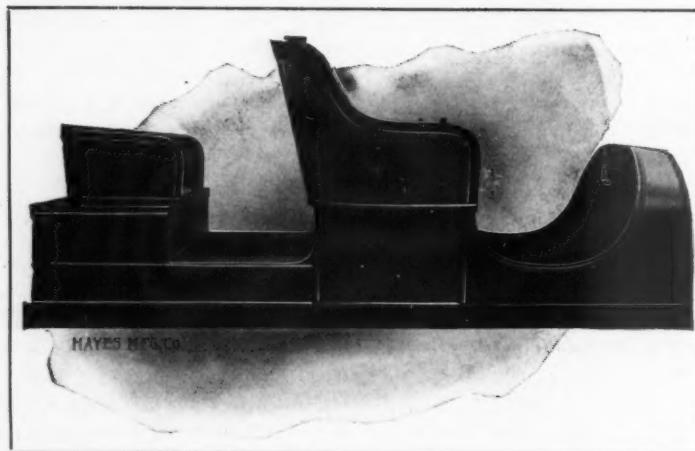
2542 Wabash
Avenue

Chicago

Now located in our new building—largest in the world devoted to Top and Glass front industries.

WE MANUFACTURE

Metal Bodies,
Radiators,
Hoods,
Dashes,
Tanks,
Garage Floor Pans



Fenders,
Fender Irons and
Sockets,
Under Bonnets,
Tool and
Battery Boxes

Metal Body

We enamel in black and colors. We have a good proposition for dealers and repair men.

HAYES MANUFACTURING COMPANY

460 Maybury Grand Ave., DETROIT.

A NOTED AMERICAN AUTHOR ONCE SAID:

"As regards cleanliness, there are but two conditions in which comfort can be enjoyed; one is being absolutely clean, the other is being absolutely dirty."

Many there are who also agree there are but two conditions of comfort when exposed to rain; one being absolutely dry and the other being absolutely wet, but in each case most people prefer the former condition.

A fine motor car equipped with a dirty, faded, shabby top, is indeed a common and disagreeable combination.

A leaky top is exasperating to say the least.

If you seek cleanliness, comfort and durability, it will pay you to consider carefully the covering material to be used on your top and demand—

Pantasote

—as the value of a top in these respects is dependent almost entirely on the covering material used.

By insisting on PANTASOTE and making certain it is furnished, you are assured of getting a material the quality of which is uniform and recognized for superiority.

By accepting any material that may be offered you are sure to get whatever the top maker can buy cheapest to increase his profits—almost anything that will look well at the time of delivery.

Samples of complete leather and mackintosh line on application.

Fisher Building
Chicago

THE PANTASOTE CO.

11 Broadway
New York

Understand that PANTASOTE, a product made only by us, is quite different in composition from all other top materials, they being made with either rubber or cellulose coatings.

As every one knows, rubber is ruined by exposure to oils or continued sunlight. This is especially true of thin coatings of compounded rubber as used on top goods, and to what is a top subjected more than sunlight and the ever-present oils of an automobile.

Cellulose compounds are not adapted to outside use, as they harden and crack from exposure or low temperature and are no longer waterproof.

Then, too, they have an objectionable odor.

The following desirable features make PANTASOTE a little more expensive but far more satisfactory:

A gum coating especially adapted to outside use; impervious to oils, grease, gasoline, sunlight; odorless; absolutely fast in color; easily cleaned and perfectly waterproof.

Linings of the best cloths that can be obtained and as fast as the art of dyeing can produce.

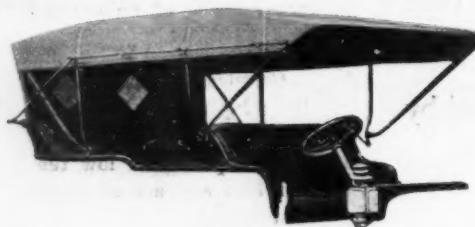
A double fabric construction to insure waterproofness, and a veneer strength to resist tearing and stretching out of shape.

Unequalled satisfaction has induced every railroad in the country to adopt PANTASOTE for car curtains, and practically every maker of high-grade automobiles for tops.

STORMS
ARE HERE
EQUIP

YOUR CAR WITH A
MONARCH
TOP AND WIND SHIELD

PERFECT PROTECTION AGAINST THE WORST STORMS THAT BLOW



Made from the best material. Designed right. Strong and handsome. Workmanship is unsurpassed. Easily folded, quickly detached.

Before Placing Your Order
Get Our Prices



MONARCH AUTO TOP & SUPPLY CO., 1218 Michigan Ave., Chicago, Ill.



EVERY AUTOMOBILE AT THE SHOW

Will Sooner or Later Be Groomed With

CLEANOLA

Nothing like Cleanola for cleaning and polishing all varnished surfaces. Removes mud stains and rain spots. Covers varnish cracks and scratches. Leaves hard, lustrous surface. Cleanola can be used with



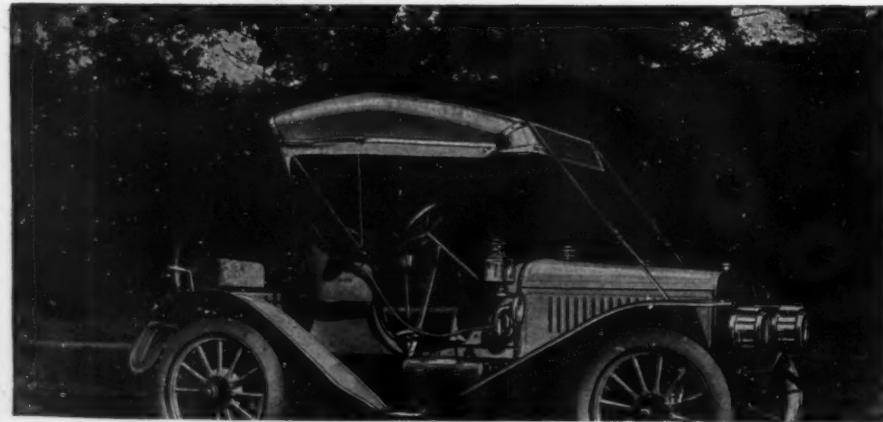
equally good results on Leather Tops and Seats. Most perfect cleaning compound for all varnished surfaces and the only one free from alkali or acid. Renews and lengthens life of the varnish.

Used by Principal Railroads
and Palace Car Companies

CLEANS, POLISHES, RENEWS, PRESERVES
THE CLEANOLA COMPANY
FULTON BUILDING, Dept. B - PITTSBURG, PA.

25c can sent as sample to
10c postage and dealer's name

COL. SPRAGUE'S AUTO TOPS AND FRONTS



No. 36 RUNABOUT TOP

If you see them at the Auto Show, you will say they are the best that can be made. We will be at the Palace and Garden Auto Shows in New York, and at the Chicago Show. You won't see these shows right if you don't see our new Tops and Fronts. We've got some new ones. Our new "Leader" Front is a corker, in price and quality.

Ask for our elegant catalogue and price list.

The Sprague Umbrella Co.
Norwalk, Ohio, U. S. A.

HIGH GRADE AUTOMOBILE TOPS

AMERICAN TOP CO., Jackson, Mich.

Automobile Dealers, Look Here—



You are in business to make money — certainly. Why not make all you can? The top business with you should be a money maker. How? Buy your tops from Warner and get the best possible value for the least money. Only best material used. Built strong and durable; gracefully designed; price attractive. Always keep their shape. Perfect fitting.

Write for Catalog, Prices and Samples

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LUCAS "AUTO-KLEAN"

Preserves the gloss and beauty of your automobile as nothing else can. Keeps the body, finished parts and leather parts as bright as when new.

Unlike ordinary Automobile Soaps and Polishes, "AUTO-KLEAN" contains no acid or alkali to deaden the gloss and destroy the finish. Positively no grit to scratch or discolor the finest finish, as it is put up in DUST-PROOF CANS.

"AUTO-KLEAN" removes all dust, dirt, grease, finger marks, cloudiness and mud stains, and does not leave the surface sticky or gummy, but bright and brilliant like new.

Indispensable to Motorists.

Nothing on the market to compare with it. Insist on the genuine. Don't be an easy mark and accept something "just as good"—it isn't.

PRICES

Large dust-proof can (garage size) each \$2.50
Medium " " for carrying in auto 1.00
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Substitutes are dangerous at any price

For sale by Leading Supply Dealers and Garages, or write us for list of dealers and our booklet containing full directions.

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Why "King" Tops represent quality. A postal will bring you samples and quotations you cannot afford to miss.
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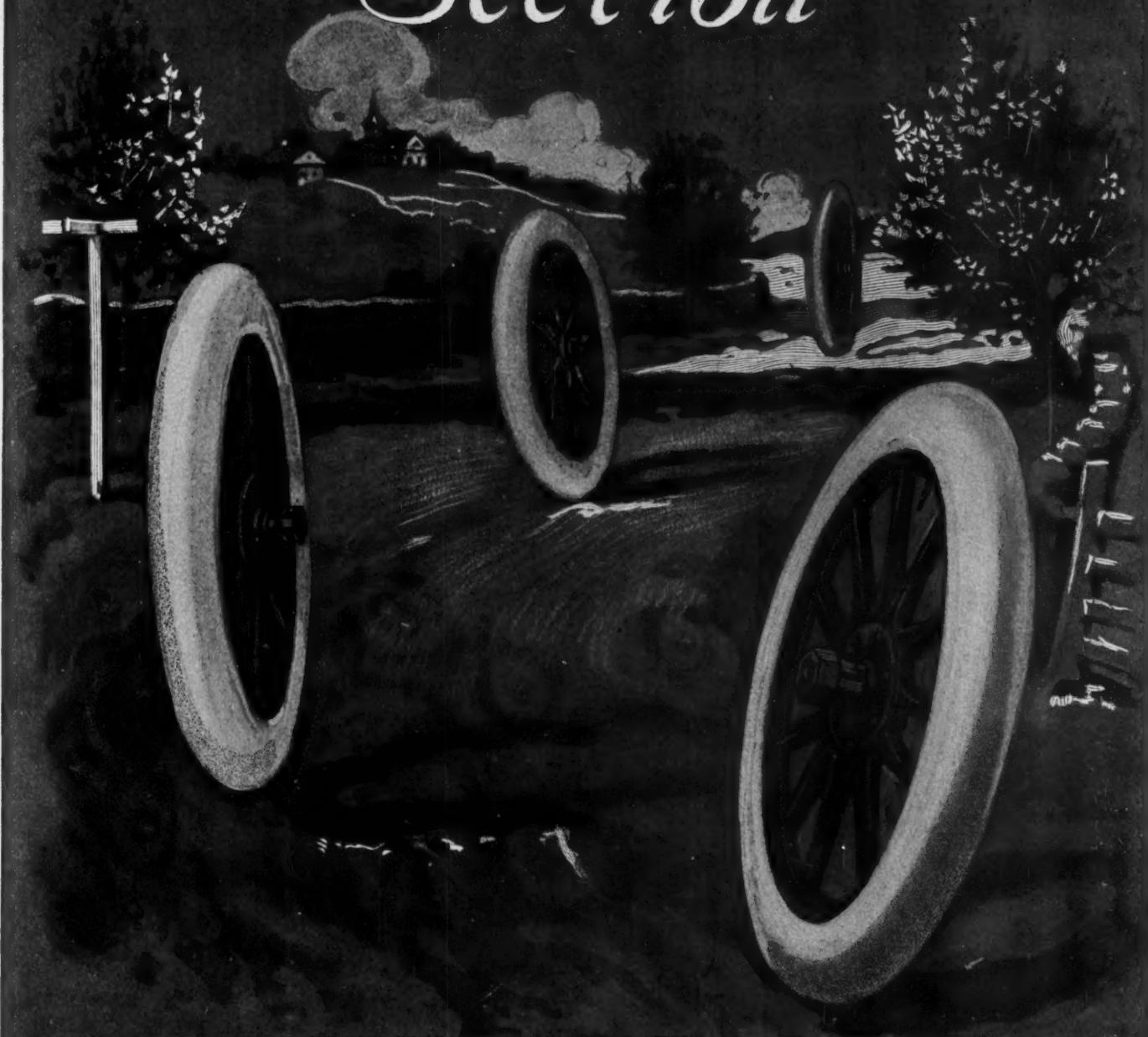
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If you are using leather get our circular of the "Areameter" Leather Measuring Machine, it will pay you.

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Wheel, Rim and Tire Section



INCLUDING

Pneumatic and Solid Tires, Wood and Steel Wheels, Hubs,
Caps, Bearings and Fittings.

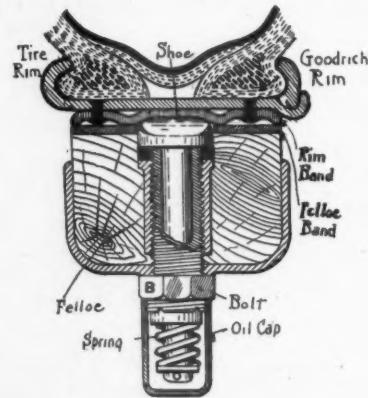


The Beauty of a Nadall Demountable Rim

is summed up as follows:

1. Enables tire changes to be made on the road in three to five minutes, without any possibility of a hitch in the operation.
2. Anybody can make the change on the darkest night or in the coldest weather.
3. No effort is required and no tools, except a simple wrench.
4. There are no detachable parts whatever to get lost in the shuffle. No nuts to start. Nothing comes off but the tire rim.
5. Insures absolute safety in running. Wheel would break before tire could come off.
6. No bolts or nuts to protrude on side of wheel—a very unsightly feature of all demountable rims excepting the Nadall.
7. Only demountable rim on the market which can be used with a quick detachable tire, thus securing the only combination of tire equipment which is proof against delay and trouble in changing tires en route.

See Our Exhibits at Madison Square Garden, New York, and Coliseum, Chicago.



How the Nadall Demountable Rim Works

Two to four expanding shoes protrude through the felloe rim and fit into grooved depressions on the inside of tire rim. By applying a wrench to these bolt heads the shoes are tightened or released without effort, and the rim quickly secured or released. So securely do these shoes hold that the wheel must break before they could be dislodged. The tire can thus be changed without detaching a single part. An oil cup on bolt head serves to keep it in perfect condition.

Responsible Agents Wanted to Handle the Nadall Demountable Rim. Address

NADALL MFG. COMPANY
1223 Michigan Ave., CHICAGO



About Wheels, Rims and Tires

THE wheelmaker's art is as old as the hills. And there are a good many points in relation to wheels entitling them to more than passing notice. In the first place, the rim speed of a wheel of an automobile reaches the high maximum of approximately two and a half miles per minute. With the idea of illustrating just what this means, it is to point out that the rim speed on the flywheel on a 5,000-horsepower steam engine would be limited to one mile per minute. Wheels for automobiles must be nearly devoid of flywheel effect, and this is an extremely difficult matter, unless the felloes are of wood and of small section. Fortunately, wood exhibits rare qualities under the condition in which it is used in wheels, and the felloes and spokes can be of small cross-section without trespassing upon the desired factor of safety.

The Camber in Wheels—The better grade of wheels are provided with at least ten spokes for the front and twelve spokes for the rear and the spokes are set at an angle, giving a "dished" effect. This is not with a view to enhancing the appearance, but with the idea of enormously increasing the ability of a wheel to sustain against side strain. The amount of camber given the wheels is enough so that the spokes are appreciable longer than the radial distance from the hub to the felloe. Because of this distance and its influence, a wheel cannot be "dished" by an outside force out of the plane it is given at the time of its construction unless the rim and the felloe part. The reason for this lies in the fact that all the spokes are in compression and all share the responsibilities equally. It is not necessary, then, to have spokes of large section and great weight, whereas, on the other hand, resiliency is imparted to the wheel if the spokes are not of such great section, especially if they are whittled down in such a way as to make them rigid in the sheer plane only. This year's cars have decidedly improved wheels, both as respects the design and in that the diameters are greater than they were in the past. There never was any question as to the undesirability of some of the low diameter wheels used in the past. The wheels lacked resiliency and the tires used were too small to do the work. These matters have been corrected very largely and an attempt is being made to maintain the high standard of second-growth hickory, long the standard wood for wheelmaking, and now growing more scarce year by year, thus introducing a considerable wheel problem. This is one of the reasons why steel wheels are used quite extensively, although it is true that steel "disc" wheels are chosen for their great strength, as well as the fact that the service in which they are used demands heroic treatment. Indeed, it is a question if steel wheels may not become very popular in the near course of events.

Hubs in Modern Wheels—The trend is entirely in the direction of ball and roller bearings for wheels and the hubs are accurately machined from steel castings or die forgings, as the case may be. Provision is made for keeping the lubricant within the hub cavities so that the ball or roller bearings are profusely lubricated. Hub flanges are wide and a suitable number of bolts of good diameter are used to bolt the wood-work into secure relation. There is decided tendency also to have the spokes at the miter very accurately fitted and fastened by glue, so that it will be readily feasible to disassemble

the wheels at any time for whatever purpose as, for illustration, a new hub might be substituted at will for one damaged in service.

Something About Rims—While the clincher type of rim has been long and favorably regarded, the fact remains that the average autoist rarely feels capable of coping with the tire trouble that might arise because of the difficulties involved. Demountable rims came into vogue because there was a demand for means by which tires could be changed by men of ordinary strength under unfavorable conditions. The demountable rims are, apparently, just as secure as the clincher type, and certainly it is much easier to change tires if demountable rims are used. At the present time rims are made of the finest grade of materials and the joint is rendered strong by the electrical welding process. There are several schemes by which the demountable feature is rendered practicable, and experience rather goes to show that any choice is purely as a personal matter.

Improvements in Tires—The first great improvement in the tire situation came by way of a reduction in price, thus enabling builders of cars to use wheels big enough for the purpose. It would not be far fetched to say that the smallest runabout would have tires as big as we find on the largest touring car today, price permitting. The life of a small tire on a big car, in which speed and weight are considerable factors, is too short to be regarded from a commercial point of view. If larger tires are being used at the present time it is also a fact that experience has lent zest to the undertaking and the quality of tires is on a higher plane.

A visit to the tiremakers' plants would show the use of better materials, a more discriminating selection of rubber and refinements in the process than can only end in better tires. These same refinements and the quickening of the process were, of course, largely responsible for the cut in price, which cut, in turn, as before stated, enable builders of cars to select tires big enough for the purpose. Tires are made in the several well-known standard sizes; they nearly all seem to be of the wrapped tread variety and the non-skid feature is properly cared for just as in the past.

Use of Solid Tires—Of solid tires and the special forms of rubber tires now much in use a book could be written extolling their well-known virtues and the last word would not even then be said. In trucking work to do without the "solids" would be equal to choosing to do without the trucks. It is quite out of the question to maintain the present pace with trucks considering the use of anything but solid tires or special forms of tires of rubber independently of the well-known pneumatic tires excepting in special cases.

Tire-Filling Compounds—In certain classes of work the pneumatic tires are filled with a compound instead of air. It will not be possible at this time to discuss the compositions in detail more than to say that they do serve a very useful purpose.

Run on Ball and Roller Bearings—The old types of plain artillery hubs are no longer to be seen. Ball and roller bearings have proven their worth, not only because they "slay" friction, but by reason of endurance as well. The types of bearings available are in such great profusion as to render discussion here futile unless to reiterate their fine qualities.

FISK AUTOMOBILE TIRES

BOLTED-ON TYPE STANDARD CLINCHER TYPE
 Q. D. CLINCHER TYPE INNER TUBES FOR ALL TYPES
 FOR SALE BY ALL DEALERS FURNISHED BY THE MAJORITY OF MANUFACTURERS WHEN SPECIFIED

THE FISK REMOVABLE RIM

with BOLTED-ON TIRE is the
IDEAL TIRE EQUIPMENT

ABSOLUTELY SAFE

EASY TO HANDLE

**Fisk Bolted-on Tires and Removable Rims will
 be furnished by any of the following automobile
 manufacturers at the extra price of rims:**

**3½ inch and 4 inch,
 \$60.00 per set, includ-
 ing extra rim.**

**4½ inch, 5 inch and 6
 inch sizes, \$75.00 per
 set, including extra
 rim.**

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THE FISK RUBBER CO.

Chicopee Falls Mass.

Foremost Diamond Wrapped Tread Tires



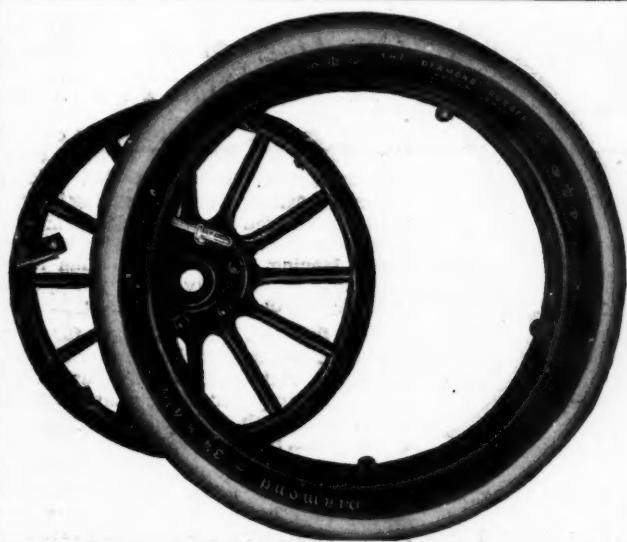
Pre-eminently in First Position in Service, Satisfaction and Number Used

Logically constructed from the beginning, their advance in efficiency has been logically worked out.

With more of our tires in service than have any other two manufacturers combined, we have had by far the most comprehensive field for the judgment of results.

To the utmost this advantage has been used.

A better tire for 1909 than you have ever been offered.



Diamond Demountable Rims

For Inflated Extra Tires

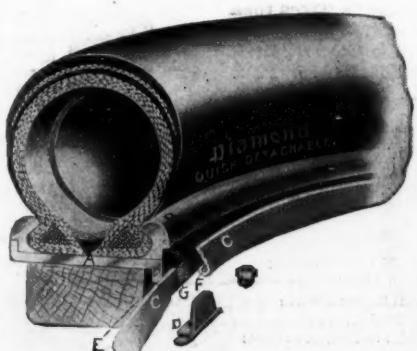
The Simplest, Quickest, Best. Absolutely Secure and Absolutely Safe

THE MARSH QUICK ACTING CLINCHER RIM

100% Efficiency

The Diamond Rubber Co.

AKRON, OHIO



How To Bring Up A Tire On A Bottle In Thirty Seconds



Goodyear Air Bottle Means No More Tire Pumping

EVER hear of bringing up a tire on the Goodyear Bottle? Sure! It beats the old-fashioned way of bringing the tire up by hand "all hollow." Not one-tenth the trouble.

And tires brought up on the Goodyear Bottle are well brought up too—better behaved—more healthy—live longer—do a good deal more work—save you a lot of money.

It's such a big success that we are going to give every motorist in the world a chance to try it free for two years—charging only the nominal cost of the first bottle.

The Goodyear Air Bottle is a small steel bottle charged with pure air (not gas). It is usually carried under the seat or on the running-board of an automobile.

When you want to inflate a tire, you simply attach the rubber tube from the Air Bottle to the tire—open the valve and let 'er fill.

While you stand by and comfortably watch the performance until time to shut 'er off.

Doesn't look much like your old familiar job of giving an imitation of your wash lady in the midst of her Monday morning exercise, does it? Doesn't feel like it, either.

No more back-breaking, hand-blistering tire pumping! That grim task which robbed motorizing of its pleasure can be crossed off your list of troubles.

Any woman or child can inflate a tire with the Goodyear Air Bottle—it's so simple.

And the beauty of it is that the tire can be brought up to just the right pressure.

This is important. It makes tires last 50 per cent longer. Under-inflated tires give out quickly.

By inflating to exactly the right pressure with the Goodyear Air Bottle, rim-cuts and other tire troubles are avoided. Ninety per cent of tire troubles come from under-inflation.

If you have Goodyear Detachable Auto Tires on Goodyear Universal Rims, the Goodyear Air Bottle will enable you to be on your way a few minutes after the puncture occurs.

And with any tire, it cuts out half the work and drudgery.

Any motorist in the last Glidden Tour can tell you what a blessing the Goodyear Air Bottle is. A big truck loaded with Goodyear Air Bottles met the tourists from day to day at the various points of the tour.

All contestants who desired the Free Goodyear Air Bottle service were supplied, regardless of the kind of tires they rode.

Every day the empty bottles were taken back and replaced with fully charged ones.

Thus, the Glidden Tourists always had a fresh filling for a deflated tire right at hand—no delay—no labor.

Altogether the Goodyear Air Bottle was voted the best thing that had happened since the Glidden Tour began.



Write us for our "The Care of an Auto Tire," which gives valuable information about the care of tires and the exact pressure to which each size of tire should be inflated to give the longest service.

bottle from six to thirty-five. They will partially inflate many more. The bottles will inflate approximately 15 per cent fewer Goodyear Detachable Tires than Clincher Tires of corresponding size, the reason being that the GOODYEAR DETACHABLE TIRE IS 15 PER CENT OVER SIZE.



See it at
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New York
Shows,
Space 109
Gallery
Palace Show,
Space 103
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Platform
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New York, 64th St. and Broadway
San Francisco, 506 Golden Gate Ave.

Chicago, 80-82 Michigan Avenue
Cleveland, 2005 Euclid Avenue
Milwaukee, 188-192 Eighth Street
St. Louis, 3935-3937 Olive Street
Buffalo, 719 Main Street
Detroit, 251 Jefferson Avenue

Pittsburg, 5988 Centre Avenue
Omaha, 2010 Farnam Street
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Kansas City, 16th and McGee Streets

What *Good* Tires Mean to You

Throughout the world Morgan & Wright tires are known as good tires—because they *are*.

To the motorist this statement of *demonstrated* quality means much, for—

It is a guarantee against wholly unnecessary repair bills—against *all* repair bills, in fact, except those necessitated by accident or natural wear;

It stands for *protection to the car*, which can be secured only by the use of tires that are built to withstand *emergency* tests as well as ordinary service;

It's an assurance that you will be spared the exasperating inconvenience which always attends breakdowns of *any* kind—especially those against which you *could* be protected.

Morgan & Wright Tires

have literally *won over* hundreds of motorists by reason of their protective quality—the quality that makes them absolutely safe under *any* condition.

Whether this protection is secured through the grade of materials used, or through our method of tire-building, or as a result of extremely rigid inspection which every tire undergoes before it is permitted to leave the factory, is comparatively unimportant to the user.

The vital consideration—and the only one that appeals to the experienced motorist—is this:

These tires actually stand up day in and day out under every condition of both load and road, as only tires can that are made as MORGAN & WRIGHT Tires are.

And it is because users of these tires have repeatedly found this to be true, that we invite *all* motorists to give them an impartial, comparative test.

**There is no method of making friends
equal to the method of making good**

**MORGAN & WRIGHT
DETROIT, MICH.**

Branches, Agencies or Dealers Everywhere

Goodrich Tires

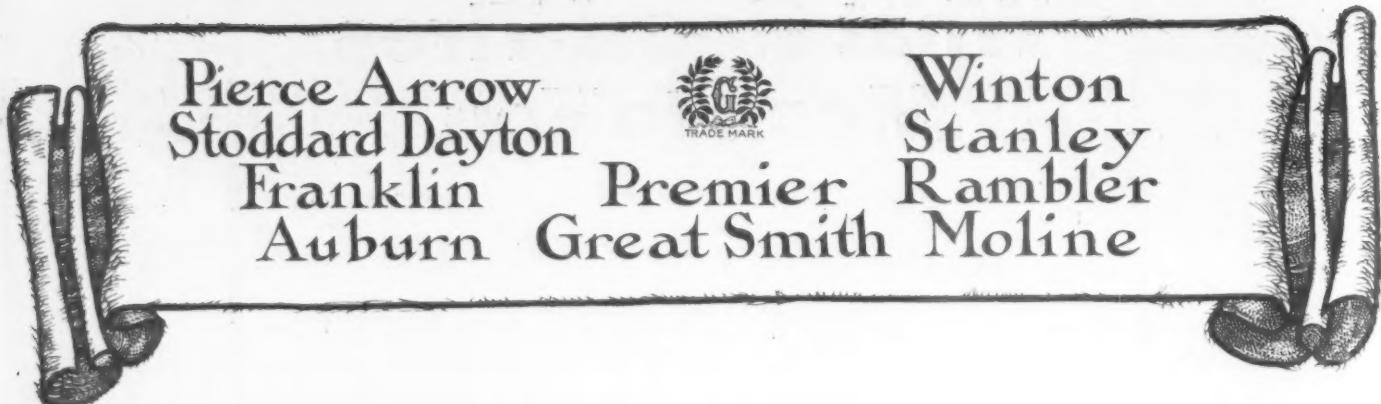
The Regular Equipment for 1909 on the

Pierce Arrow
Stoddard Dayton
Franklin
Auburn



Premier

Winton
Stanley
Rambler
Great Smith Moline



The selection of Goodrich Tires by such well known manufacturers as the George N. Pierce Co., Winton Motor Carriage Co., Dayton Motor Car Co., Thos. B. Jeffery Mfg. Co., H. H. Franklin Mfg. Co., Premier Motor Mfg. Co., Auburn Automobile Co., Smith Motor Car Co., Stanley Motor Car Co., and Moline Automobile Co., is significant not only to the patrons of these manufacturers, but to all motordom. It is a seal of approval from those best able to judge the relative merits of automobile tires—and those who want the best.

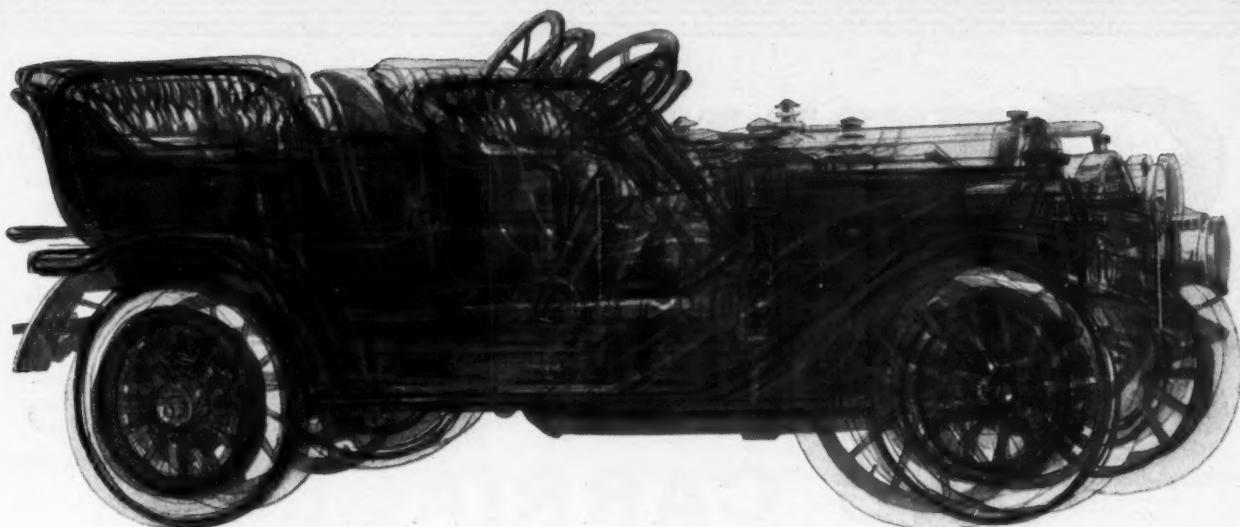
The B. F. Goodrich Company, Akron, Ohio

Factories, Akron, Ohio

Chicago	Philadelphia	Boston	Pittsburg	Detroit	Minneapolis	Cleveland
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Our products are also handled in New York and Buffalo by the B. F. GOODRICH COMPANY of New York,
and in San Francisco, Los Angeles, Seattle

When Writing to Advertisers, Please Mention Motor Age.



The composite "shadowgraph" of these motor cars reveals the average tendency of leading American designers. . . A composite of all Goodrich Road Records would reveal how largely Goodrich Tires have **justified their selection** in practically every endurance contest of importance in America—including the last four Glidden Tours—as well as in the hands of thousands of users.

In Every Sense of the Word—"The Tires with a Record"

The B.F. Goodrich Company, Akron, Ohio

Factories, Akron, Ohio

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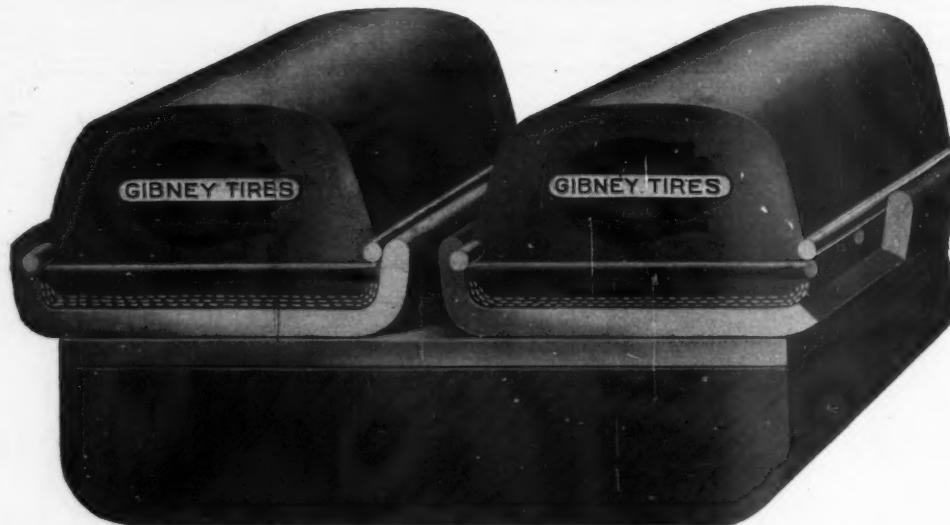
Our products are also handled in New York and Buffalo by the B. F. GOODRICH COMPANY of New York,
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GIBNEY SOLID TIRES

— FOR —

COMMERCIAL VEHICLES AND CARRIAGES



TWIN SOLID TIRE

THE TIRES FOR LONG WEAR, HARD SERVICE, ALL-ROUND ECONOMY

They are strong enough for the heaviest commercial truck or bus, yet resilient enough to take all the jolts and save the vehicle.

Made with the greatest possible percentage of pure Para Rubber, they are without question the superior of any solid tire in the world.

The marvelous growth in sales of Gibney tires is solely attributable to the fact that they have given longer service and greater satisfaction than any tire on the market.

READY FOR DELIVERY BECAUSE WE MAKE THEM

Distributors for

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Also Importers and Jobbers of **AUTO ACCESSORIES**

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211-13 North Broad Street, Philadelphia, U. S. A.

Agents Wanted Everywhere



It doesn't take the automobiling public long to learn which tires are giving the best service.

G & J TIRES

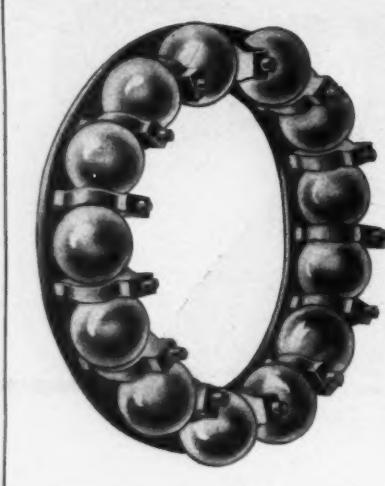
are made to give the automobile owner his full money's worth in service—and that they have made good is evidenced by their ever increasing demand. You will make no mistake in specifying them on your new cars.

Yes, we will exhibit at both the New York Shows. If you will be there call and see us—if not, write for a copy of our new catalogue.

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Pittsburg, Baum and Beatty Streets



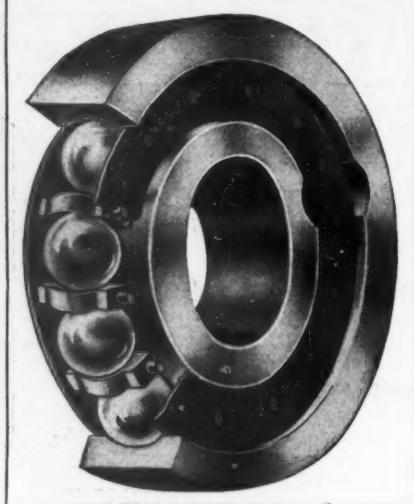
Schafer Bearings

(Made in Germany)

Contain 92% Balls.

Carrying capacity greater than any ball bearing made.

Made of the finest steel and fully guaranteed.



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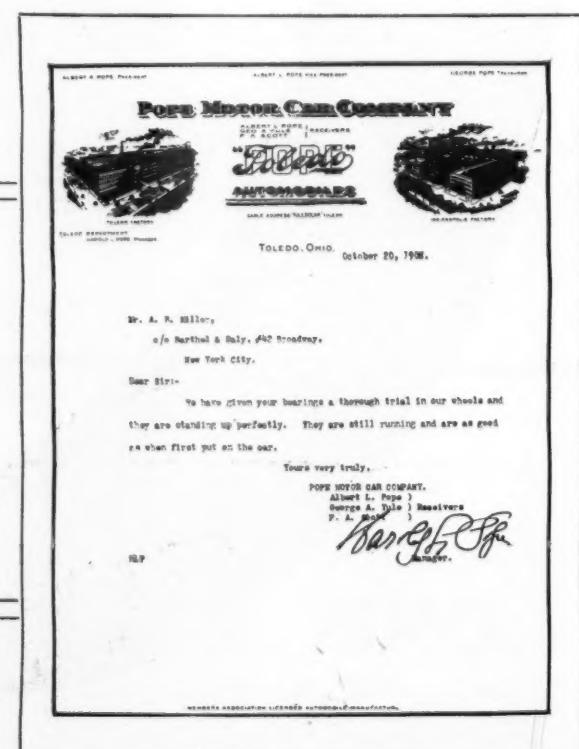
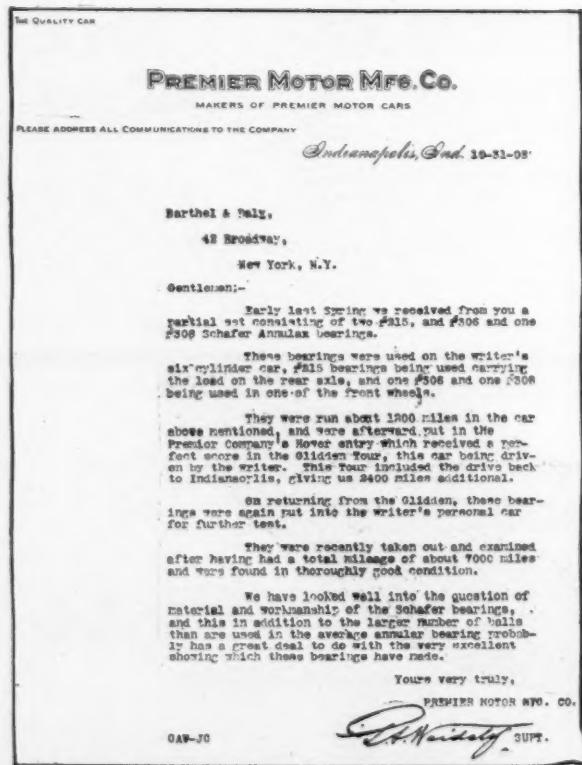
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Sole Importers

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NEW YORK CITY

What Users of "SCHAFER" Say

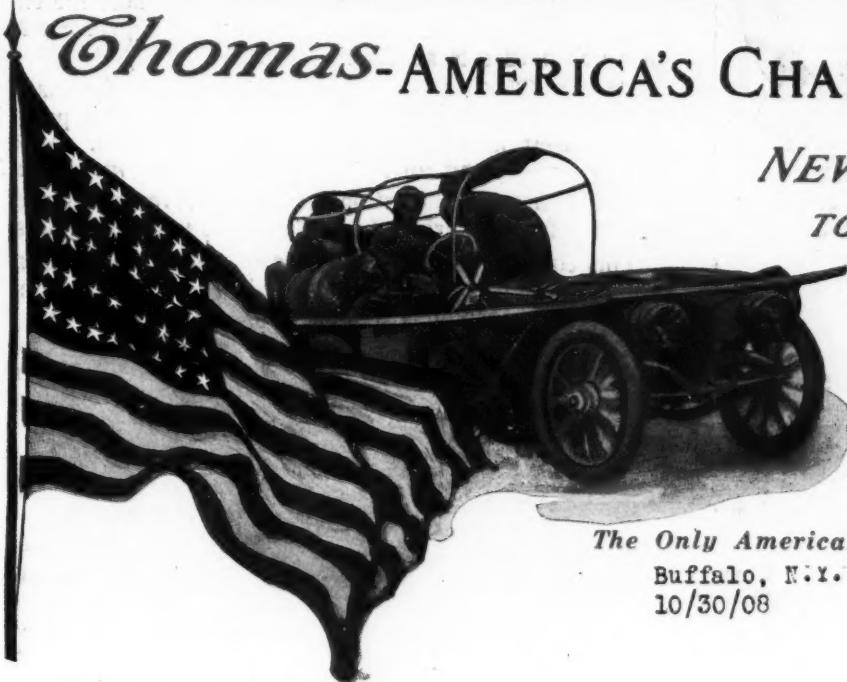


Salisbury Wheel and Manufacturing Co.

AUTOMOBILE WHEELS AND AXLES

Jamestown, N.Y.

The Thomas - AMERICA'S CHAMPION



NEW YORK
TO PARIS
RACE

The Only American Car Entered
Buffalo, N.Y.
10/30/08

Salisbury Wheel & Mfg. Co.,
Jamestown, N.Y.

Gentlemen:-

The Thomas car driven by me, and winner of the New York to Paris race, was equipped with Salisbury Wheels, not specially constructed, but the same wheels which you had been furnishing for all Thomas Flyers, and I think you will have to go a long way before you will find a test which will give your wheels as great punishment as was experienced in that long and difficult journey.

Roads of every description were encountered, and when you stop to think that the car traveled over thirteen thousand miles under its own power, through snow, mud and swamps, fording streams, climbing mountains, and worst of all bumping over four hundred and fifty miles of cross ties in Siberia, you will see for yourself how they have been treated.

Notwithstanding this tremendous usage, I am pleased to say that there was no breakage of or trouble with the wheels whatsoever, and the wheels now upon the car are those which carried me safely to victory, and are in condition which would apparently permit them to do the trip over again. You are to be congratulated upon the performance of your product.

Yours very truly,

George Schuster
Driver of the Thomas Flyer in

New York to Paris race.

GENESEE MECHANICAL CLINCHER AUTOMOBILE TIRE



THE MOST PRACTICAL TIRE EVER INVENTED

Easier to Remove

This same good feature in construction makes the Genesee Tire easier and quicker to remove, when that is desired, than any other clincher tire.

To sum up, there is not one point of advantage possessed by any other tire of domestic or foreign manufacture, that is not embodied in the Genesee Tire. And there are several features exclusively in the Genesee patent design and construction which are peculiarly exclusive to it.

The Genesee Tire is the ONLY Clincher Tire in the World with the Improvements Here Shown and Described

Speaking broadly, all tires *except the Genesee Tire* are of a like construction, differing only as to quality.

Look at this sectional of a Genesee Tire—note the exclusive and *natural* wedged lock—and *mechanical* lock formed by valve. Not a lug needed—not a bolt needed to secure tire to rim.

Genesee Tires cannot creep. The full, firm foundation is locked to rim by means of valve. The improved formation of it provides ample foundation for itself, and for the inner tube to rest upon. A perfect and complete support for tire and for inner tube. *No other make can have this.*

This Genesee construction absolutely prevents water, dirt or other foreign substance from entering the tire. There is no possible space for it.

This equal division of weight also places all side strains on that part of tire best able to resist unusual strains, and at the same time renders the Genesee Tire absolutely safe against accidentally being stripped from rim.

The inner tube cannot be pinched nor chafed, because the inner edge of tire in this construction, as you notice, is *flush* with the entire inside surface, thus forming a continuous, naturally round tube. No chance for inner tube to get caught between lugs—there are no lugs.

The entire volume of inner tube is always *above the rim*, thus securing the benefit of *all the air space*, which means the maximum of resiliency and speed.

The inner tube is supported equally on all sides, which divides the strain evenly on every bit of its area, adding durability and greatest possible mileage.

The Genesee is the only perfectly balanced clincher tire. That is, the weight of the outer edge or circumference exactly equals the weight of its inner edge—the part next the rim. All tire experts have known the good of this principle of weight distribution, but none others have succeeded in carrying it out practically. This feature makes for the maximum of mileage.

A Tire With Highest Quality

To say nothing of the maker's responsibility, so good a principle embodied in it, demanded that the Genesee Tire be as near perfection, in quality of material and workmanship, as human effort could make it.

The very best grade of Old Fine Para Rubber, specially selected; and best obtainable grade of Sea Island Cotton, specially woven to our order; these are the only materials used.

To make good, reliable tires demands a high type of sober, skilled and *loyal* men. Our factory is located in the heart of the tire-making industry. We know the best men in the business. They are in our employ.

Nothing but the high grade Genesee Tire is made in our factory. The best thought and undivided energy is being devoted exclusively to the manufacture of this Tire alone.



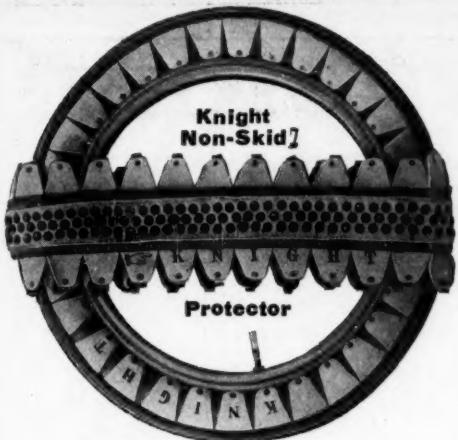
TO THE DEALER:
You can make no mistake in pushing this tire with your trade this season. The Quality and Construction is first-class in every respect. Write for prices.



THOS. D. BUICK CO.
MANUFACTURERS OF
Genesee
AUTOMOBILE
TIRES AND TUBES



Flint, Mich.



KNIGHT LEATHER GOODS ARE SUCCESSFUL Because they are Better

Five years of use
have proved their
value.

We manufacture

**STEERING KNUCKLE
BOOTS and FAN BELTS**

Detroit Leather Works

844 Woodward Ave.

DETROIT, MICHIGAN

Agencies at
CLEVELAND CHICAGO

Write for our Descriptive
Circular and Prices.



Mr. Motorist:—

You cannot afford to take the word of some other fellow in the important question of tires. The "show me" spirit of "the Man from Missouri" pervades the trade world of to-day. How many times have you heard and appreciated the truth of the old statement—"The Proof of the Pudding is in the Eating"?

AJAX TIRES

are the gratifying result of modern machinery combined with high-class materials and intelligent workmanship. A 5,000 mile written guarantee reflects the confidence of the Ajax-Grieb Rubber Company in their product. Write for a copy.

AJAX-GRIEB RUBBER CO.

General Offices: 1776 Broadway, New York City **Factories: Trenton, N. J.**

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Milwaukee Agents—Goodyear Rubber Company

Exhibited at the Grand Central Palace and Madison Square Garden Shows

Dayton Airless Tire "Makes Good"



**No Pumping
No Puncturing
No Blowouts
No Delays**

So Calculated and Constructed Mechanically that it is equally as Resilient as a Pneumatic Tire.

The season of 1908 not only a success but a triumph!

During the season of 1908 we made thousands of tires and sold them in nearly every state in the Union and several foreign countries, for all weights of cars from 900 pounds to 4,500 pounds unloaded, driven by all kinds of drivers on all sorts of roads. Many of them have already run from 3,000 to 5,000 miles and are still in good condition, and appear to be good for two or three times as many more miles.

There is nothing new mechanically, nor "freakish" about a DAYTON AIRLESS TIRE. It is built exactly as an Engineer would construct a bridge. The rubber columns in the tire correspond with the columns of a bridge, while the tread surface of the tire, corresponds with the road surface of the bridge; and the heavy annular rib or extra fabric in the tire, forming the very thick tread, corresponds with the heavy beams connecting the bridge columns. This heavy annular rib of fabric in the tire strengthens between columns, so that there will be no more depression between the columns than right over the columns, hence the tire wears uniformly all around the tread. The columns vary in thickness and strength corresponding with the different weights of cars.

The difference between a DAYTON AIRLESS TIRE and a solid tire, is the difference between a properly constructed bridge and a dam.

There is no sponge rubber nor metal of any kind in the construction of a DAYTON AIRLESS TIRE, but only the highest grade of Up River Para Fine Rubber and the best Sea Island Fabric, together with the necessary ingredients to give strength to the rubber and cause it to cure or vulcanize properly.

The tire is moulded or "cured" over a metal form in one operation, hence the columns are a part of the tire and will not separate therefrom nor crush down.

We will guarantee:

FIRST: That the tire rides as easy as a properly inflated pneumatic tire.

SECOND: That it will sustain its rated carrying capacity stamped thereon, and retain its resiliency, and the columns will not crush down.

THIRD: That a car equipped with our tire will not consume any more gasoline and will run as fast as if equipped with pneumatics.

FOURTH: That it will outlast several average pneumatics.

FIFTH: That it will fit standard Clincher rims; can be applied easily and cannot come off in use.

Write today for illustrated catalogue containing full particulars of tire, guarantee and testimonials, even though you are not in immediate need of new tires. It will pay you to know the "last word" on tires—The 1909 DAYTON AIRLESS.

The Dayton Rubber Mfg. Co.

1206 Kiser St., Dayton, Ohio, U. S. A.

New York Salesroom, 1968 Broadway

See us at space 316, 3d floor, Grand Central Palace Show, Dec. 31 to Jan. 7.
Also space 445, 3d tier boxes, Madison Square Garden Show, January 16 to 23.

"Firestone" Non-Skid Tire

The Tread is composed entirely of rubber; it is formed by the raised oblique lettering, "FIRESTONE NON-SKID".

Presents a greater variety and number of angles and edges and points of road contact, to prevent slipping, than any other Non-Skid in existence.



The wear resisting quality of this Tread is a revelation to motorists accustomed to the extravagant expense and short-lived efficiency of ordinary non-slip devices.

ASK TO SEE IT

Firestone Tire & Rubber Co.

Branches and Agencies Almost Everywhere. **Akron, Ohio**

"DERMANIT" RENDERS TIRES PUNCTURE PROOF



It is comforting and affords a whole lot of satisfaction to know that if a puncture comes to your tire it will be automatically stopped and that you won't have to wait and make tire changes or lay by a few hours until some one comes to your relief.

"Permanit" affords all of these pleasing conditions and keeps your tires perfect all the time.

"Permanit" is not a tire filler—simply 8 oz. of powder which is placed in the inner tube. If a puncture comes this powder coming in contact with the air forms an immediate seal automatically and without attention, except perhaps a stop of half a minute or less.

It may pass in your mind that the use of "Permanit" may in some way damage your tire or abate its elasticity. If it does we'll furnish you with a new tire at our expense, F. O. B. wherever you are. The only possible thing you can expect from the use of "Permanit" will be absolute reliability, efficiency and satisfaction.

So there you stand. Here is a solution of your tire troubles, right at hand. The least you can do is to ask for proofs and details, and the sooner the better for you.

"Permanit" is the quickest seller a dealer can have—the profit is worth while.

In your own interest write today and get full particulars and prices and discounts to dealers, or send 53 cents for sample carton, which is sufficient for a bicycle tire.

The ADOLF KARL COMPANY, 239 Washington St., Newark, N. J.

See Our Exhibit at the Madison Square Garden Show



When it comes time to figure up your season's running expenses, you begin to notice what your tires have cost you. You find that there are more than first costs to consider—that there is a "trouble cost" as well.

KING LEATHER TIRES

are made from specially tanned leather that is both water and weather proof. They do away with 90% of your tire difficulties. Guaranteed against punctures, blowouts and rim-cuts, they will more than outlast two ordinary rubber tires. In fact, they carry a special mileage guarantee of from 5,000 to 10,000 miles.

Whether or not you contemplate purchasing, we want to tell you more about King Leather Tires—about their construction, about their special armor covering of rivets, about their non-skidding qualities and about the satisfaction they have given to others. Send us a post card for our folder with the full story.

Liberal commissions will be allowed to live agents.

THE KING LEATHER TIRE CO.
370 East Water St., Milwaukee, Wis.



Adopt an Improvement NOT A SUBSTITUTE

for troublesome inflated tires, by equipping with

SWINEHART DEPENDABLE TIRES

Resilient as properly inflated pneumatics. Wear from 3 to 5 times as long. Fit standard clincher or universal rims. Easily applied with free hand tool. One-third higher above rim than other cushion tires.

PUNCTURE-PROOF—ECONOMICAL.

Details in catalog "G."

Swinehart Clincher Tire & Rubber Co., Akron, Ohio
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For the use of OWNERS and DRIVERS of Cars fitted with INTERNAL COMBUSTION MOTORS
BY FORREST E. JONES, M. E.

President of the Manhattan Automobile School.
Size, 4½ by 7 inches
Pages, 134. With Drawings.

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The most practical, up-to-date work on the subject in the English Language. Published in pocketbook form, with high-grade leather cover, and printed on tough paper, it is intended to be the inseparable companion of the autoist when on tour. It treats of the automobile in modern form and of all the troubles that may be remedied by the driver himself. It is written in plain language. The subject matter is in the form of question and answer, and an exhaustive cross index makes immediate reference possible in any particular case.

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Until you use a Michelin Tire properly inflated, you do not know what a good tire is.

Michelin superiority is particularly shown in Michelin Anti-Skids.

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Absolutely Trouble Proof

THE GOSHEN AIRLESS CLINCHER TIRE

More Mileage

Cannot blow out—cannot puncture—eliminates repair bills and delays on the road—rides as easy as a pneumatic and has all the good features of pneumatics without their defects—outward appearance is exactly like that of pneumatic tires and fully their equal in resiliency, yet will outwear several ordinary tires; will fit any standard clincher rim and is fully guaranteed.



Why Not Insure

your tires against punctures, rim cutting and blow outs and

YOURSELF

freedom from constant worry that something will happen to your tires to give you a disagreeable job of tire repairing on the roadside?

With Goshen Airless

you are relieved of all fear of tire troubles, and in addition cut down cost of tire maintenance. *It is better to buy good tires that will give long and satisfactory service their entire life rather than to buy cheaper tires and have continual trouble and expense.*

Descriptive circular and prices mailed on application. Some good territory still open for progressive agents—write us. See Exhibit, Space 311-A, Grand Central Palace, New York, Dec. 31-Jan. 7.

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GOSHEN, INDIANA

Western Representative—*Trouble Proof Tire Co.*
 223 Rush St., Chicago.

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A complete tire change can be made in 8 minutes by unskilled operators with the
HEALY RAPID REMOVABLE RIM
 Fitted to old or new wheels in 24 hours. Guaranteed to stand hardest wear. Price \$80 with extra rim and wrench. Write for catalogue.
HEALY LEATHER TIRE CO.
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**100 MANUFACTURERS
USING AND TESTING
INDESTRUCTIBLE
STEEL WHEELS**
 O.K. them in every way. Write us for information
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**The New Motz
Non-Skid
Cushion Tire**
 Fits Universal and Standard Clincher Rims. We furnish a tool for applying.
 Send for Circular H.
 The Motz Clincher Tire & Rubber Co.
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**P. S. & CO.
RED INNER TUBES
GUARANTEED
PURE
PARA RUBBER**
 PARKER, STEARNS & CO., NEW YORK

Pennsylvania The motorist
who has read
Clincher our new book "Factory
Facts" has a clear and
Tires helpful knowledge of just how tires
are made. Write for it and read it.
PENNSYLVANIA RUBBER CO., Jeannette, Pa.


**SCHRADER
UNIVERSAL VALVES**
 TRADE MARK REGISTERED APRIL 30, 1895.
 The Standard American Valves for
 Automobile, Bicycle & Vehicle tires
 Manufactured by
 A. SCHRADER'S SON, INC.
 28-32 Rose St. New York, U.S.A.

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 Republic Rubber Co., Youngstown, O.

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Tires! Tires! TIRES!

We can sell you any make, any size or style tire or tube for less money than any dealer anywhere in the United States.

We have contracts with the leading makers of automobile tires to sell for them any quantity of surplus stock, enabling us to quote these at 60 per cent to 70 per cent discount from the regular price. Do not buy tires until you get our prices. Bargains in all makes of tires and tubes.

CLINCHERS DUNLOPS Quick Detachables

We guarantee these brand new, clean, fresh 1908 stock. This lot includes Morgan & Wright, Ajax, Diamond, Continental, Ennis and Pennsylvania, etc. We are selling the lot while they last.

Size	Casings	Tubes
28x2 1/2	\$ 7.00	\$2.50
28x3	11.00	3.00
28x3 1/2	15.00	3.50
30x2 1/2	8.50	2.75
30x3	12.25	3.50
30x3 1/2	15.25	3.75
30x4	18.50	5.25
32x3	10.50	3.25
32x3 1/2	16.00	4.00
32x4	20.00	5.50
34x3	9.25	3.50
34x3 1/2	16.00	4.25
34x4	22.50	5.75
34x4 1/2	23.50	7.50
34x5	23.00	6.50
36x3 1/2	13.25	4.25
36x4	21.50	6.25
36x4 1/2	24.00	8.00
36x4	23.75	8.25

These prices are only good while our stock lasts, therefore place your order now to get the benefit of our low figures. TERMS are Cash. At the very low price we are selling them we are obliged to get cash with order. Do not hesitate to send us money. We are as good as the bank. All C. O. D. orders must be accompanied with 10 per cent of purchase to cover us on transportation charges.

If you are dissatisfied with your purchase upon receipt of goods we will refund your money.

Send for Complete List

SINGLE TUBE TIRES

26x2 1/2, \$8. 28x2 1/2, \$9. 28x3, \$11.

By securing a very large quantity of these goods we are enabled to quote you these extraordinary low prices.

**Excelsior Tire
Company**
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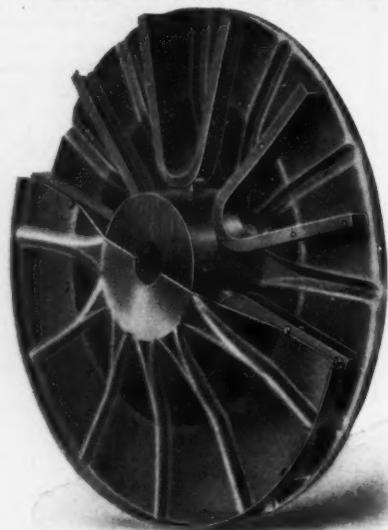
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INDESTRUCTIBLE STEEL WHEELS

FOR HEAVY COMMERCIAL CARS AND TRUCKS



Showing Construction of SPREADERS, without hubs or rims attached.

The above cut shows the manner of spreading the discs in order to support the outer edge of wide rims, such as are now used on heavy commercial machines, giving great strength to the wheel and therefore making it particularly valuable for carrying heavy loads.

POSITIVE PROVEN FACTS FROM ACTUAL TESTS

- 1st. Very MUCH stronger and more durable.
- 2d. Enamelled, which is RICHER, CHEAPER, QUICKER, and lasts much longer than paint.
- 3d. Easily cleaned and collects less MUD and DUST than wood wheels.
- 4th. The MOST resilient wheel made.
- 5th. Absolutely true, never can Warp, Swell or Shrink in any climate.
- 6th. Never can Collapse and danger of obstruction getting between spokes eliminated. A great factor of safety.
- 7th. Absolute protection for valves from injury and positive locking of valve nuts.

Try Them, to Your Profit

WE MANUFACTURE ALL KINDS OF AUTOMOBILE STEEL STAMPINGS

PLEASURE CAR WHEEL WITHOUT RIM OR HUB



The above cut shows filler furnished by us, without rim or hub, with proper provision for valve lugs and decorative holes in solid disc.

We will attach any style Rims or Hubs supplied, or will provide any Standard Hubs and Rims at cost.

WRITE FOR ILLUSTRATED AND TECHNICAL DESCRIPTIVE MATTER

INDESTRUCTIBLE STEEL WHEEL CO.

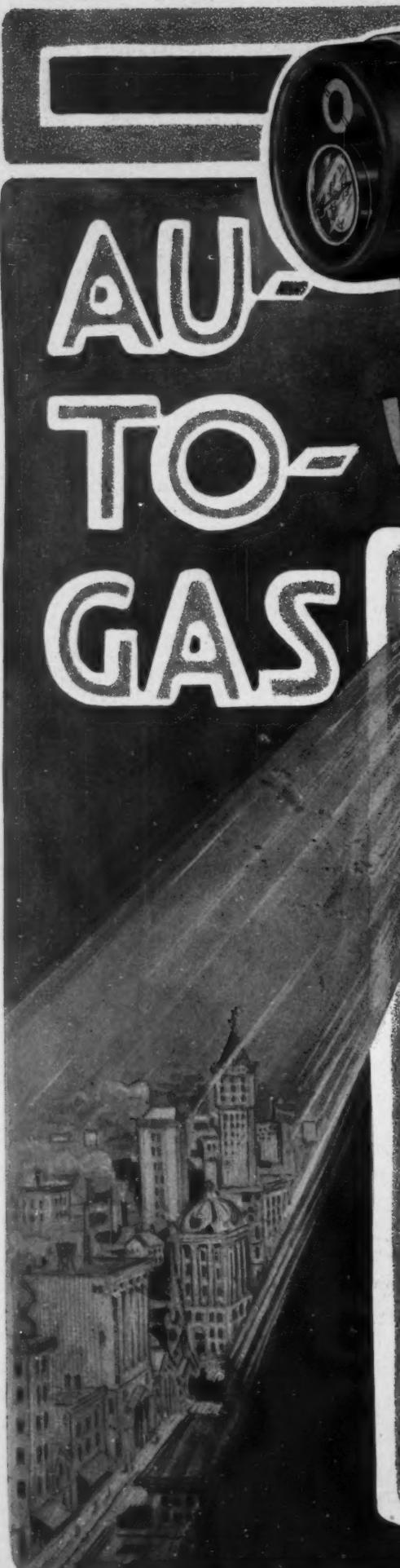
Office and Salesroom, 1303 Michigan Avenue, Chicago, Illinois

Lighting Section



INCLUDING

Acetylene, Gasoline and Electric Lamps, Generators, Tanks, Fittings,
Carbide, Trouble-Finding Repair Lamps, etc.



AU-
TO-
GAS

Light Of The Automobile World

If you would have the best in lighting equipment, a never-failing supply of pure gas, giving a strong Bright Light under all conditions and at all times, specify AUTOGAS, the long service gas tank made by the pioneer maker, Mr. P. C. Avery, who invented and made the first gas tank for automobiles, away back in 1902. AUTOGAS today is the gas tank evolved from the original, improved, enlarged and brought up to date by Mr. Avery. If you "value the value of experience" insist on AUTOGAS—the Triangle name plate indicates the genuine AUTOGAS tank.

AVERY PORTABLE LIGHTING CO.
MILWAUKEE, WIS., U. S. A.

NEW YORK
243-245 W. 57th Street.

LOS ANGELES
1200 So. Main Street

CHICAGO
1229 Michigan Ave.

Auto gas tanks are for sale by live dealers everywhere.

The Necessity of Adequate Lighting



THIS is a matter in relation to which it will be fair to say the equipment can scarcely be too good. In the early days lighting facilities were rather crude and the memory of the average autoist is a little raw when lighting is the subject. Fortunately the experience gained has been put to good account and the lighting equipment now to be had is up to a high standard.

Legal Requirements—The oil sidelights and a tail-lamp must be used to conform to the law. These lamps are usually of such good value that they serve for lighting "about town" without having to utilize the gas system. The trend in oil lamps is toward more thorough work and greater security as against the loss of parts on the road. The brackets of die forged steel are more substantial than were the castings (bronze) of the past.

Great Variety in Gas Lamps—The gas lamps to be had are in great variety and efficient in the extreme. The lenses are in sizes up to 12 inches, designed in divers ways to suit conditions. If a concentrated "beam" of light is wanted lamps are made to project the same, or, if a scattered illuminating effect is to be included, then, too, are lamps to be had. The efficiency, as measured in candlepower for a given acetylene consumption, is remarkably high.

Source of Gas Supply—The gas supply is available in two ways, viz.: (a) from tanks of acetylene under some pressure; (b) from generators in which the calcium carbide is used direct. The acetylene tanks are of convenient size and the principle of the storage of the gas may be briefly stated as follows: Asbestos wool is put into the tanks and a measured quantity of acetone is added. The acetylene gas is thereafter communicated with the tanks and the quantity of acetylene that each tank will hold is very considerably increased because of the presence of the acetone, which has an affinity for acetylene. These tanks are made in various sizes and are in strong demand.

Considering the direct generators, they are in divers form and in sizes for every possible requirement. These generators are generally made in brass, avoiding seams as much as possible, and in some cases a water jacket is provided around the carbide chamber with a view to equalizing the temperature, it being the case that dissolving carbide generates heat. A constant temperature is desirable in any case, and the best way to accomplish this end is to provide a water jacket and afford a means of regulation such as will assure the generation of gas exactly in accord with the needs. In cold weather the water is likely to freeze, and this is a disadvantage to consider.

Means of Regulating Pressure—Since gas burns under conditions involving pressure on a basis of from two to four inches water equivalent, means must be provided in connection with the acetylene tanks to maintain the constant desired pressure. The tanks are so arranged as to afford this constant pressure throughout the entire range from a full tank down to the last pound. In connection with the direct generation of gas from calcium carbide, regulation is afforded by limiting the supply of water that drips into the carbide. This water supply is automatically cared for by the pressure and means are at hand for shaking the ashes out of the carbide.

Some General Features—It is customary, and a good idea, to place the gas tank or the generator, as the case may be, in

a very accessible position not influenced by temperature changes. The running board seems to be the logical location, and the security traps or brackets, as the case may be, are generally arranged for quick undoing. While the finish is in brass, as a rule, there are oxidized effects that are well worth considering, since they present less striking appearance and greater permanence. Bright work looks extremely well if there is not too much of it and if it is maintained bright. These conditions do not always obtain.

Incidentals of the Lighting System—The piping from the generator to the lamps is generally a small annealed copper tube with rubber hose flexible terminals. This piping serves very well if it is not too small, although it is true that a certain surface accumulation is of an explosive nature, which accumulation is the result of chemical action between the acetylene and copper. This detail does not seem to be a matter of any great moment, because the little explosions oftentimes go unnoticed and never are of any great force. Besides copper tubing in the ordinary form, there is a line of flexible metallic hose in both copper and steel that serves very well indeed, although it is considerably higher priced.

Installation of the Lighting Systems—If autoists have any complaint to make in connection with lighting systems it is to point out the absence of care in running the piping. Suitable fastenings are not always provided, and piping adrift is likely to cause a rattle, even if it is not damaged at points of contact. These complaints are not general, and in the better class of cars of the present time the piping work is nicely done. As a matter of fact, the tone of the work throughout lighting systems has been considerably enhanced all along the line.

Electric Lighting Is Fast Coming Into Vogue

The use of electric lights on the electric types of vehicles was always an attractive feature, and it has always been the desire of autoists to get away from the ills of inferior means. In recent times this question has been agitated at considerable length, and the storage battery has been so thoroughly improved as to lend itself perfectly to the purpose, thus taking care of the lighting as well as of ignition work. The batteries are small, compact and durable. They give a suitable length of service on a single charge, and the facilities for charging are now thoroughly good in every way. In the early days, the batteries were not so good, and, unfortunately, the means for charging were wretched, if not outright bad.

In some of the systems means are provided for charging the batteries without removing them from the cars, and in the hands of autoists of the least bit of skill they are well worth while. True, many autoists prefer not to do any of the work involved in the upkeep of their cars, and with them it is more to the point to have the work done in a garage fitted out for the purpose. There are just such places everywhere throughout the land, and the scheme has the advantage of assuring one that the batteries will be handled by men skilled in the art. To what extent electric lights will supplant other means, it is hard to predict; possibly not at all. The chances are the kerosene lamps will be retained for emergency purposes, for which use they cannot be improved upon.



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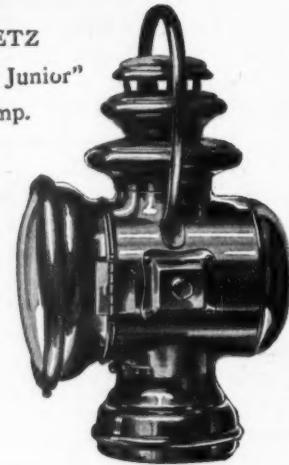
DIETZ "Excelsior" Lamp.
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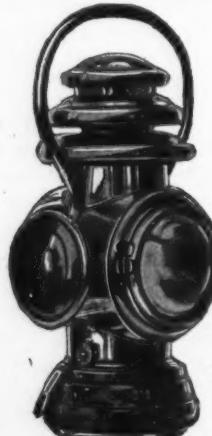
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Fits any Dietz Oil Lamp.



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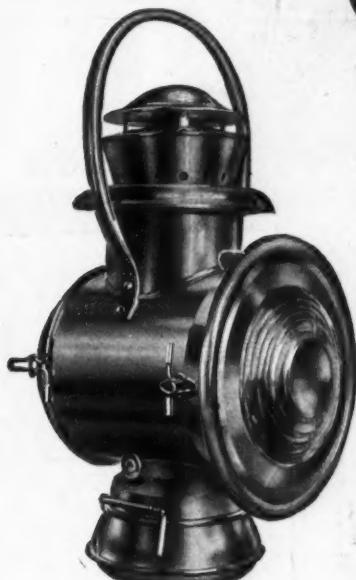
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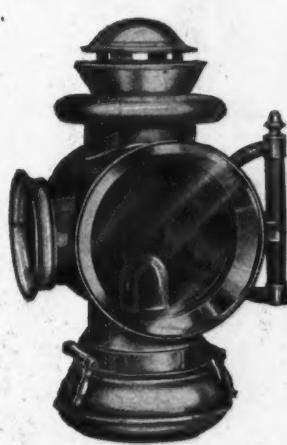
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Ham's Mars Tail Lamp



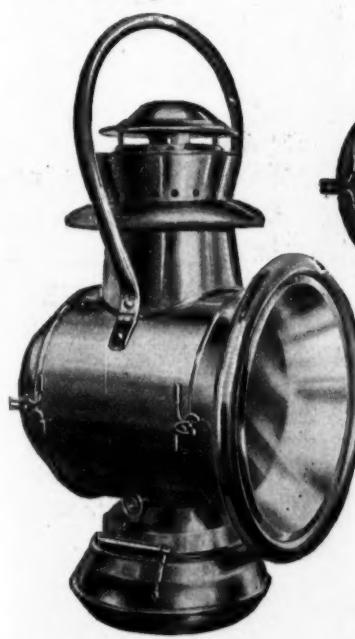
Ham's Vigilant Tail and Inspector Lamp



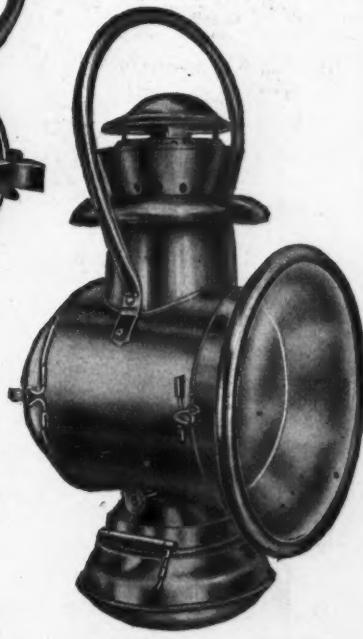
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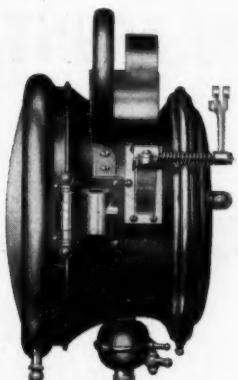
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Gas Headlights from	-	\$4.50 to \$62.50	each
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Uniform equipment on a car is an index of care and skill. A high grade car is handicapped by cheap lamps. A medium priced car increases both in efficiency and appearance by good lamps—**SOLAR LAMPS**.



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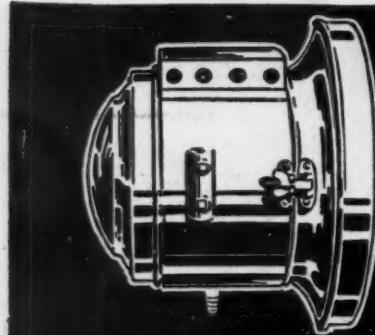
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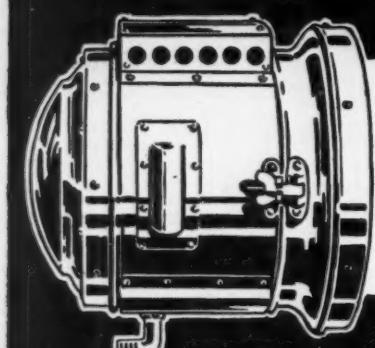
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THE LENS MIRROR OR THE FRONT DOOR?

The lens mirror, of course! An extravagant front door is only of value to make a small lamp look big until it is sold. When the purchaser lights the lamps after dark he forgets all about their front doors.

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are so low that to accept substitutes is simply a waste of good money. An output three times as great as a year ago, combined with modern factory economies everywhere, enables us to-day to sell the best lamps in the world at prices actually lower than those of the nearest imitations.

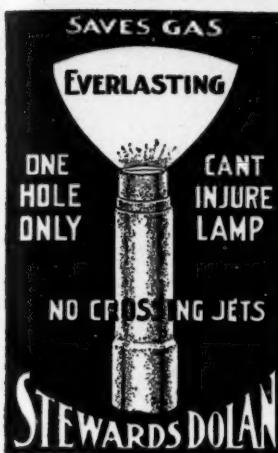
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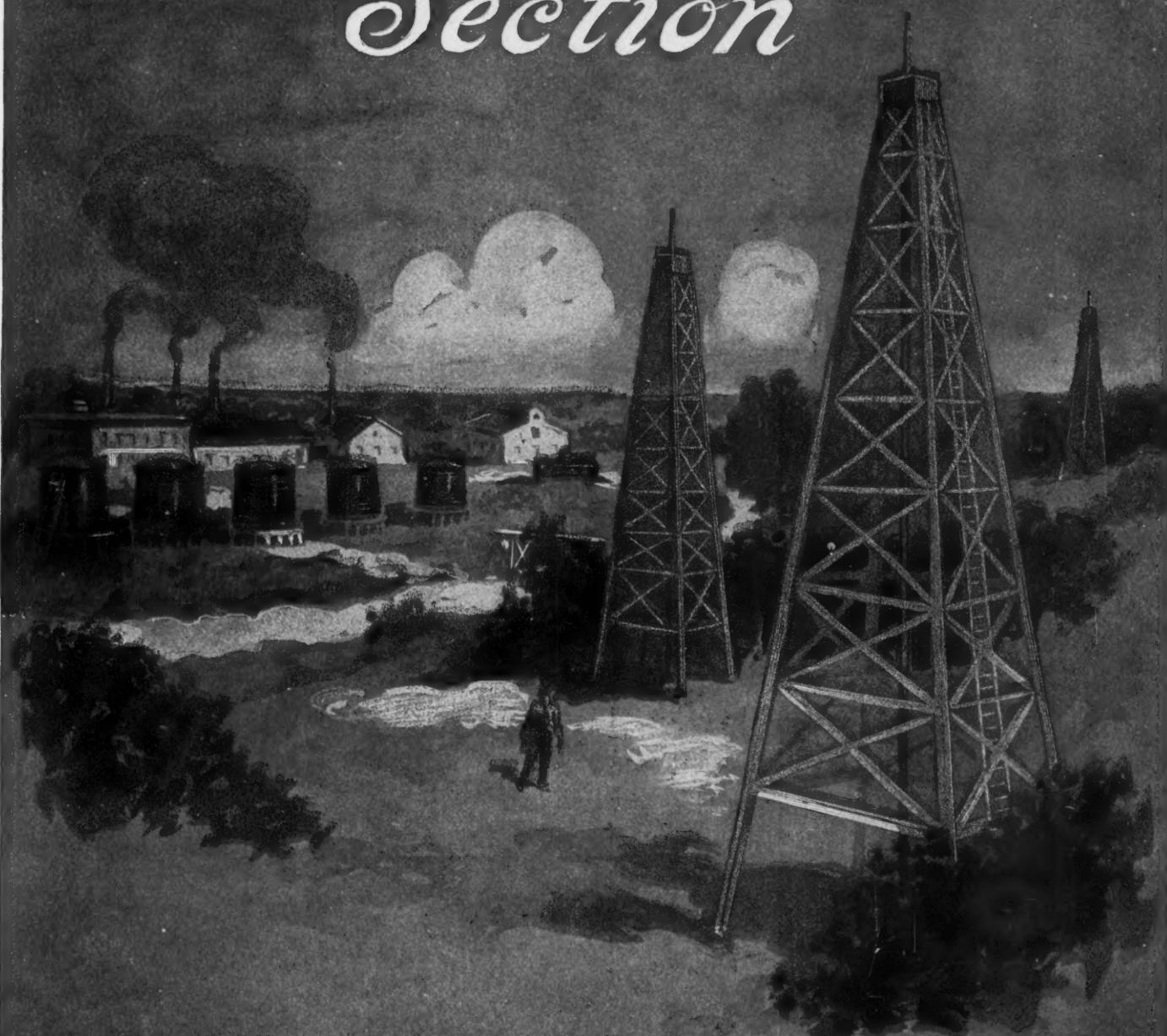
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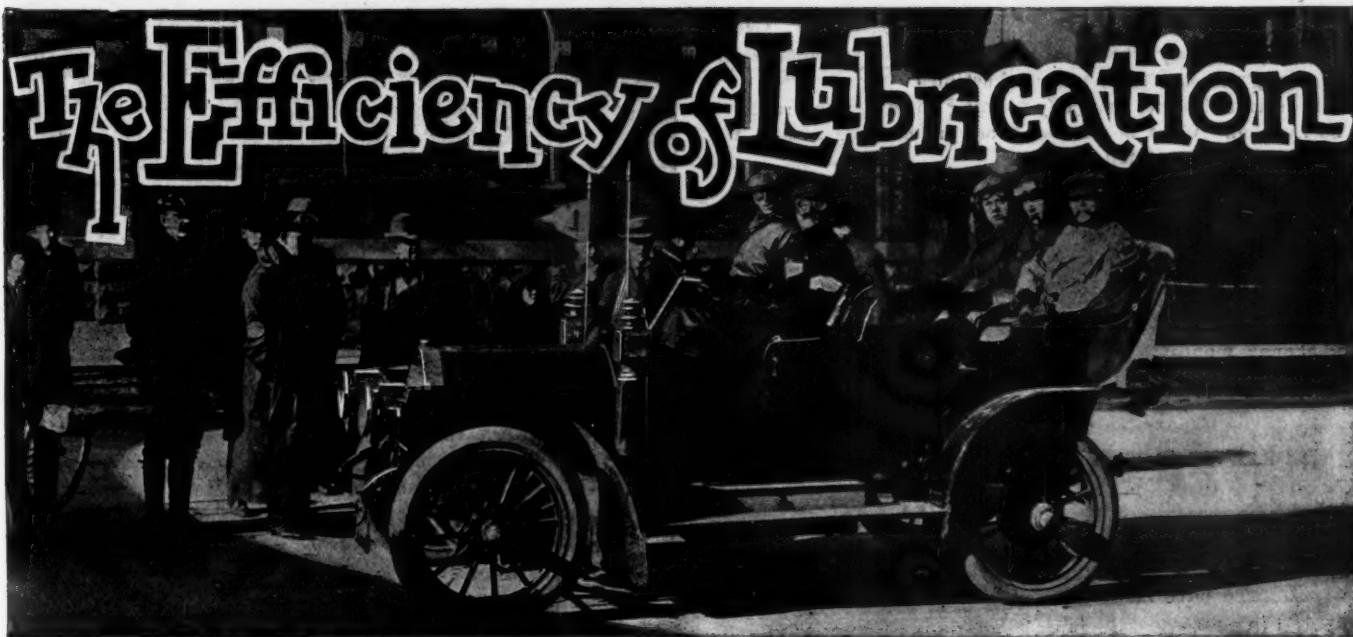
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Motor Oil
Boats

COUPON

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If the thickness of an oil film is one thousandth of an inch, a single drop of oil will cover about two square inches of surface. This drop of oil will, while it stays on the surface, do all that can be done by way of affording the slippery surface wanted, and prevent the metals from contacting. No quantity of oil can do more, and good oiling facilities consist essentially in the device that will replace that drop of oil when it ceases to extend the unctuousness desired or if it is squeezed out of place. On this basis, a cubic inch of oil will lubricate over a thousand square inches of surface, or replenish the supply on a square inch of motor bearing surface once for each revolution for a minute of time.

Lubricating products are valuable on two accounts, i. e., the cost of good lubricants is high, and the cost of repairs, if lubricants are not good, is higher.

Splash Systems of Lubrication—There is nothing much to be said in favor of the old-fashioned splash systems of lubrication, but the modern splash system is not the crude proposition that those who do not keep abreast of the times would seem to think. In the modern system the connecting rod does not splash the oil at all; on the other hand, a little scoop dips into the trough of oil and scoops up a small quantity. The trough is kept full by a single circulating (gear) pump, and the overflow goes to the "sump"; in other words, the well.

The Force Feed System—This is the system that positively replaces "the drop of oil" as it wears away under the pressure to which it is subjected. This system consists essentially of snap piston (plunger) pumps, as many as there are places to oil. The pistons are drawn back against the spring, and when the "suction" or "flooding" stroke is completed the plunger is cast free, and under the impetus of the stored energy in the spring the plunger snaps back, forcing a definite measure of oil directly to the surface to be lubricated. Great reliance is placed on this system, and it is much used.

Feeding Oil Under Pressure—In this system an oil container is connected by a system of piping to the bearings to be lubricated. Pressure is put on the container and the flow of oil is regulated. If good oil is used—and it should be—the system works.

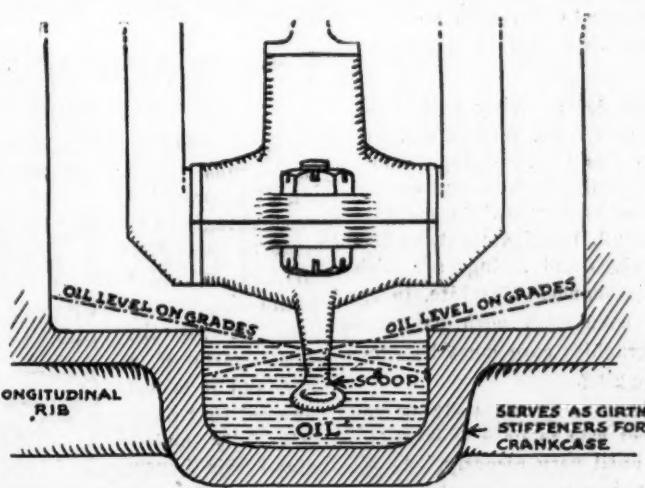
Vacuum System of Lubrication—In this system the oil is held in a chamber adjacent to the crankcase, and by a system of piping a balance is so maintained that atmosphere is admitted as oil flows out. The oil chamber is held at a partial vacuum. As in the pressure system, if good oil is used, the system is not likely to clog up.

Feeding Solid Lubricants, Grease, Etc.—Solid lubricants are placed directly in the transmission case, wheel hub caps, timer cavity, and universal joint housings. The small bearings are provided with grease cups. In some cases the solid lubricants are fed through a system of piping, under pressure.

Characteristics of Lubricants—Unctuousness is the prime property. If the oil will not afford a slippery surface, it is of no value, unless to act as a "dog in the manger" while the bearings heat up and "freeze." Anything in the oil that supplants unctuousness is detrimental, since it displaces the very property for which oil is used primarily; soapstone, chalk, talcum, or any other (so-called) body maker is, therefore, an adulterant that can have no honest place in a lubricating medium. Body, next to unctuousness, is of importance, since oil has a duty to perform aside from furnishing a slippery surface. The metals must not be allowed to come into contact with each other, and the requisite body must be there to enable the oil to sustain the pressure. Mobility is also a property that should be well regulated, in view of the arduousness of the service, and, too, the mobility should be constant. If the oil lacks mobility it will flow sluggishly, and may not be able to flow freely into the surfaces to be lubricated. Mobility should not be much affected

by temperature changes. Acidity in lubricants is the bane that leads to grief. The costly ball and roller bearings are ruined by acids, and in plain bearings the polished surfaces of the spindles and journals are ruined. Acidity may be due to a faulty process, or it may be the product of reaction in the materials used. Heat and light in the presence of atmosphere seem to be all that is necessary to render the average "animal fat" acid in its reaction within a short while after it is compounded.

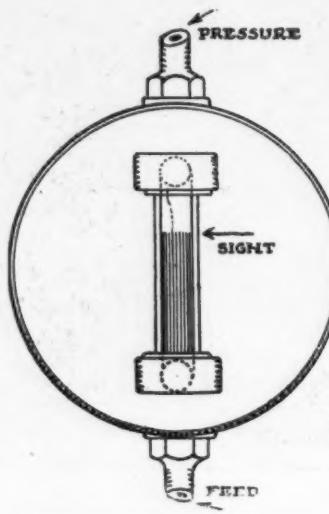
A residue after combustion is very undesirable; nor does it matter if the residue is carbon



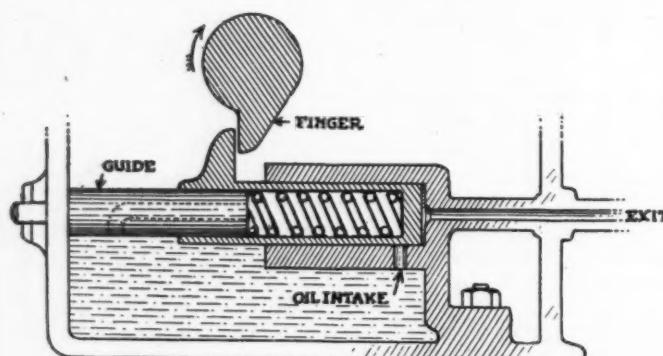
alone, or carbon and other "ash" producing elements. Cylinder oil is ultimately burned, and the products of combustion should be gases, not solid non-combustibles.

Jelly is troublesome, and jelly-forming constituents are much to be avoided. What is wanted, then, are unctuousness to the maximum, body regulated to suit the conditions, and a constant mobility unaffected by temperature. Solid lubricants should only differ in body; they should not lack in unctuousness, nor should they change mobility under temperature changes. What we do not want are acidity and residue. Pure mineral lubricants seem to be the right products in automobile work, and, fortunately, there are producers, of honesty and skill, catering to the automobile trade, who have made a study of the automobile, and who fully realize the desires and the reasons.

It is to be hoped that lubricants will not be rendered acid by the addition of substances of an acid reaction, in order to impart a sweet-scented odor. Autoists do not use lubricants as pomade. It is equally objectionable to reduce the degree of unctuousness by any clarifying process whatsoever. A good lubricant with a bad color is superior to any of the "aesthetic blends," in which the value of the qualities for lubrication may be a diminished quantity. The automobiles of today are less noisy and lower in cost of maintenance because grease cups are used in great profusion where once a hole was



CUSTOMARY PRESSURE SYSTEM

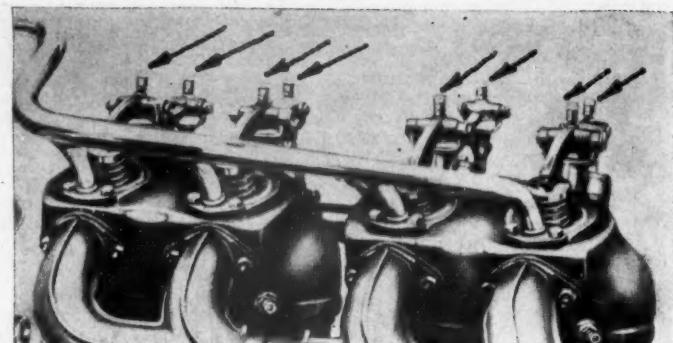


SECTION OF A CONVENTIONAL FORCE FEED SYSTEM

drilled and dirt was free to enter, there to mix with an occasional drop of oil, to make abrasions that soon increased the lost motion and the rattle.

Oil Piping and Fittings—The need for a sturdy system of piping has been felt keenly in the past, and, fortunately, the builders of automobiles are alive to this fact. Piping is now more stable, and, besides the better grades of annealed copper tubing, there seems to be a demand for "flexible metallic hose." This product is easy to install, remains tight, and is free from breakages in service. Valves and fittings are with ground joints and are stable in maintenance. Graphite, in its several aspects, is widely used in connection with both the hard and liquid lubricants. With graphite care must be exercised with the piping to prevent clogging.

Influence of Good Oil on Maintenance of Cars—It is not certain that this phase of the subject was so very well understood by even the builders of cars until very recently. At all events, taking the evidence available, it would not be far

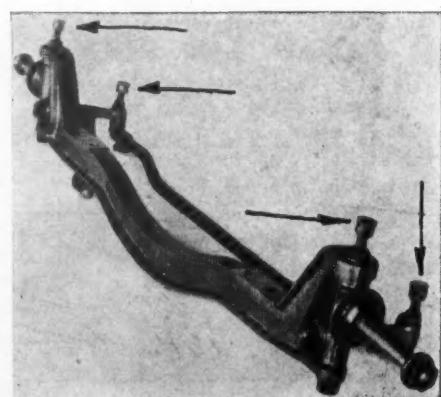


ILLUSTRATING APPLICATION OF SMALL CUPS

from wrong to say that there was not a sufficient display of oiling devices on cars until it was adequately proven that the life in service is dependent upon the care with which the oiling is done. This does not mean that a crankcase full of oil will do all there is to be done. A body of good oil laying in the crankcase will scarcely serve to oil the multiplicity of small parts that will soon cry for lubrication in a most distressing way, and if it be denied the car will reach the "noise" stage long before it is ready to "scrap," unless it is true that noise alone is sufficient cause for not wanting a car. A little grease cup on the dozen-and-one small bearings that cannot be oiled in any other way will do a world of good, and the builders of cars now recognize this fact. Users of these same cars will do well to note the fact, and they will be wise if they regard the grease cups in the light of utility devices of a high degree.

It would not be too much to say that a grease cup on a shaft or a spring, as the case may be, will do more to prevent rattle and defeat depreciation than all the polishing of bright work and varnish that can be done during the life of a car. But if it is important to keep the cups full of good grease, it is doubly so to supply a continuous film of the finest lubricant to the rotating bearings. A feast and a famine will do about as much good as no oil. True, there may be a chance of putting off the evil day, but not for long. The one sure way to avoid any trouble at all is to see to it that the oil is not only good, but that it reaches the spot. The builders of cars of the kind that an autoist of experience will be likely to choose have done their part when they provide the devices and protection from "grit." It must be understood that protection from "grit" of the road depends upon profuse oiling, as well as upon such mechanical protection as ingenuity will evolve. The underlying principle is one in which oil going out assures that grit is not passing in. Chains, for illustration, if kept well lubricated, even if they are in actual contact with the dust of the road, will take care of themselves to a marvelous extent, contrary to a popular superstition. This, too, is for the reason that the oil on the surfaces will not allow the grit to get to them. As long as the grit is warded off the situation is healthy. A run of a century on a dry chain is likely to do more damage than ten such runs on a chain provided with enough oil to coat the surfaces.

What is true of a chain is equally true of all the other parts of a car, and it is not assured that autoists fully understand this important matter.



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For heaviest GREASE or LIGHTEST OIL

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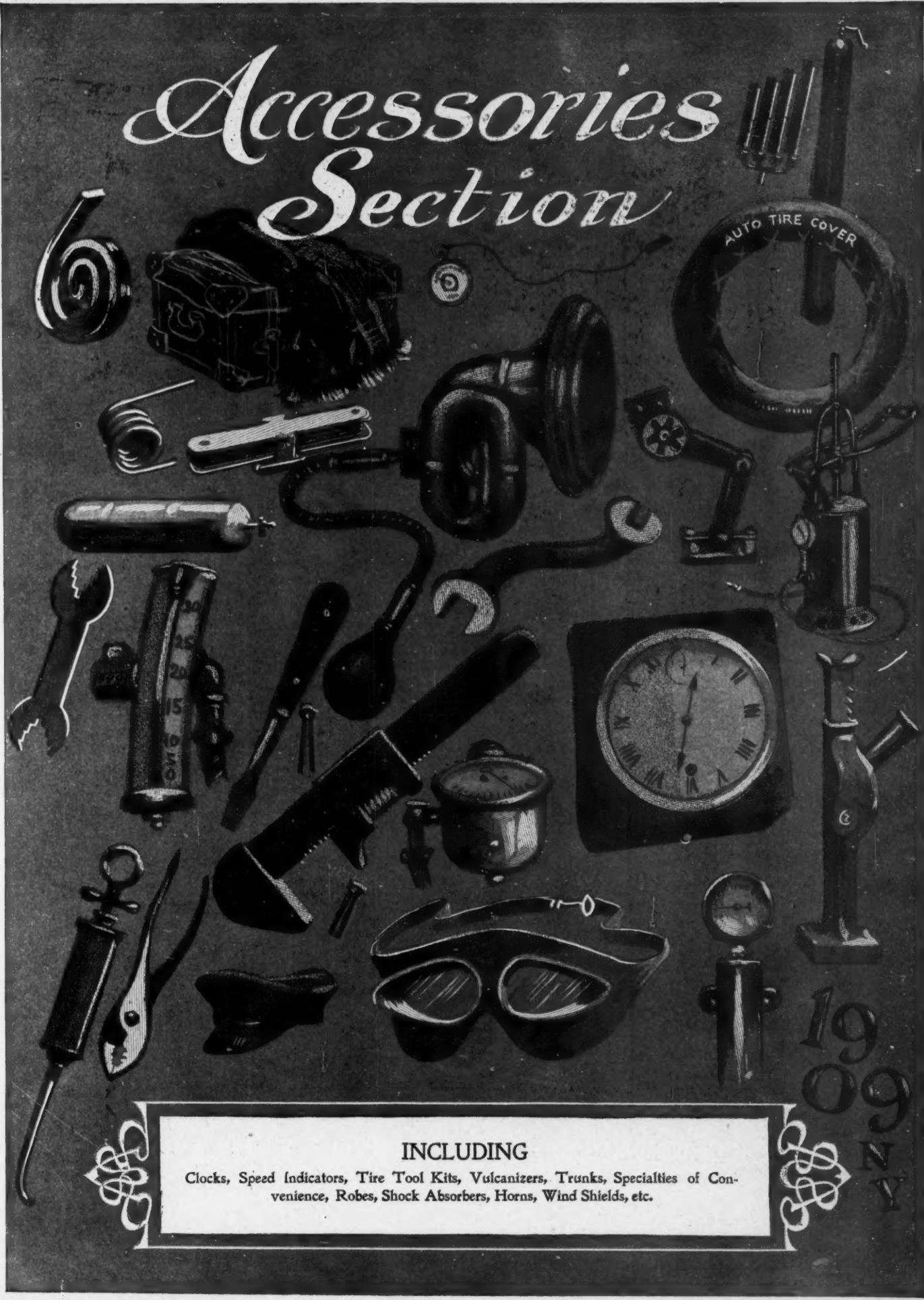
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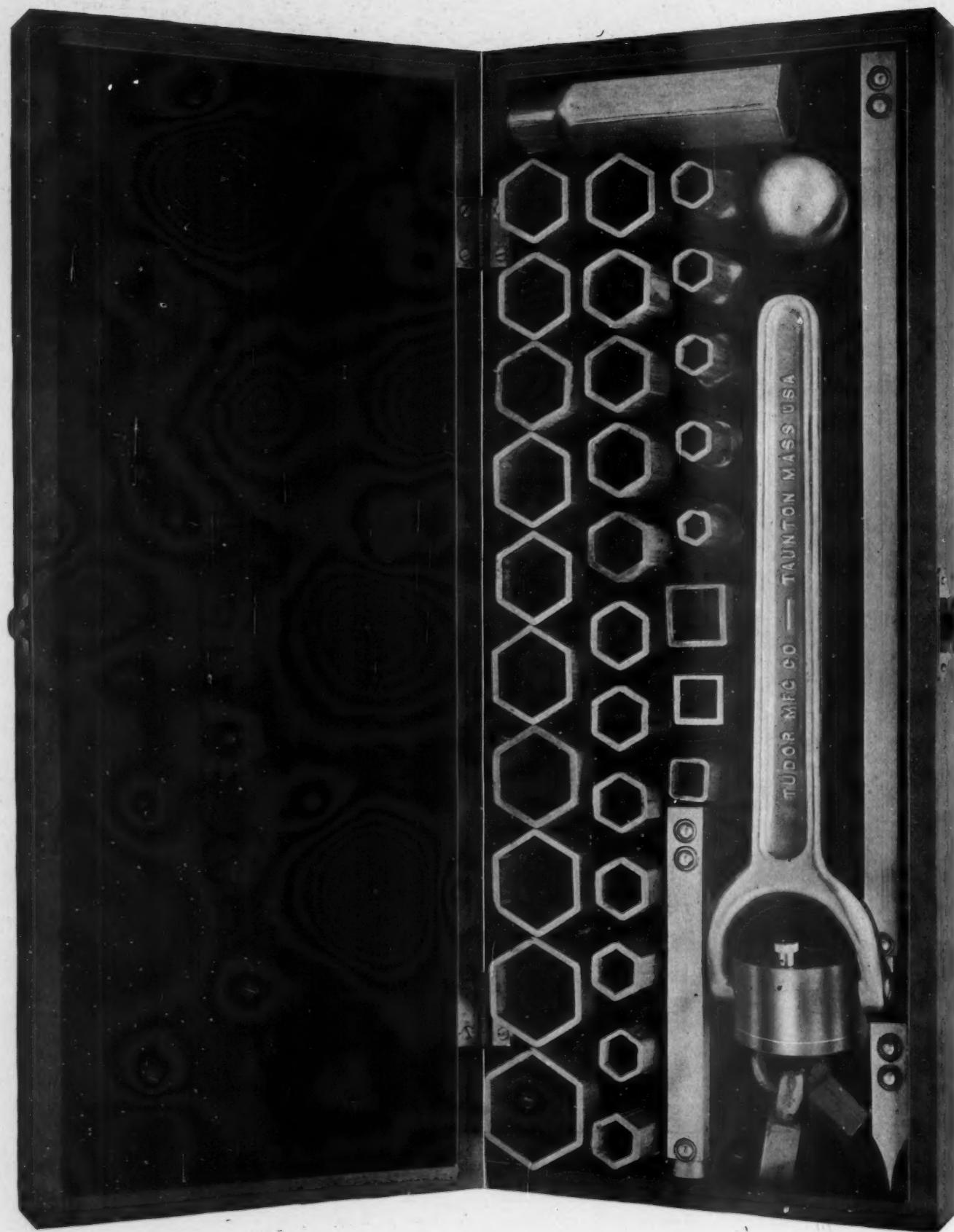
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MOTOR AGE

December 31, 1908





INTELLIGENCE displayed in the operation of automobiles should be by way of the use of proper accessories. Nothing but hands with which to cope with some unruly part of a car, under conditions remote from the haunts of the repair man, is pretty nearly sure to end with nothing but a horse to move the car. Conceding that automobiles are less prone to troubles than they were during the constructive period, it is well to be prepared when a difficulty does arise and emphasizes the need of good facilities.

Something by Way of a Tool Kit—When it comes to the selection of the small tools to go into the kit for road work, quality should certainly take precedence of quantity. While it is to be hoped that no man will ever again own an automobile so designed that it will be impossible to get at the adjustments, the fact remains that the tool kit should include the very tools best suited to the given automobile. If socket wrenches are desirable in a given case, care should be exercised to select a substantial set. At all events a complete set of "S" wrenches will be found desirable and a good-sized pipe wrench will be necessary under certain severe conditions. A tool kit would be incomplete without a selection of monkey wrenches, snips, pliers, chisels, punches, drills, a dog or two, perhaps a heavy pattern pin-vise and a variety of files. A set of taps and dies, with a selection of bolts, an assortment of rivets, some solder and a blow lamp must all be included in an equipment if the autoist is to be confident and independent.

Fittings and Tools for Coping with Tire Troubles—The ordinary "necessaire" included with cars is not sufficiently complete to enable an autoist to cope with tire troubles on an extended basis. The tire irons should be of good material and adequate section and the shape should conform to the requirements, differing somewhat on tires used. In former times a malleable iron "toothpick" lent zest to invective when autoists attempted to remove a tire case, especially if it had been in place long enough to adhere to the rim. The irons (toothpicks) were not long enough or strong enough or shaped for the work to be done. These details have been corrected to a very considerable extent, but it is always well for the individual to equip himself in a manner to suit his especial requirements. By way of repairing punctures, there are special patches to be had and fine grades of cement to be used with them and an "acid cure" that will aid to a marvelous extent by way of a permanent repair. Patches put on without any vulcanizing at all will not stay on if the tires heat up, which they do. In addition to these facilities there are tire chains that increase traction on these severe conditions and there are repair facilities such as enable the autoist to get home on a easing after a blowout. Of jacks there are a great variety and there is no gainsaying the fact that a jack is of the utmost importance. Moreover, it is well worth while to provide tire-saving lifts by which cars may be lifted off the tires when they are on storage. Tires are damaged if they stand in one

position for a considerable time unless they are permitted to assume their natural shape during that time if it is long.

Means for Inflating Tires—The mileage that can be attained on the tire depends primarily upon the quality of the tires and the weight of the car in relation to the tire dimensions. These are matters to be settled in selecting cars, but after the selection has been made there is the further question of the inflation of the tires sufficiently for the purpose. An ordinary bicycle pump will not do at all, nor can it be said that a fair-sized "compound" hand pump will be up to a fitting standard for larger sizes of pneumatic tires. Makers, realizing the need of the occasion, had introduced divers forms of air pumps that are light and suitable for the purpose, including automatic engine-driven pumps attached to frame of car. Then again the compressed inflating gas tank has come into vogue and it serves for inflating the tires to a very satisfactory degree. The inflating gas may be carbonic acid which is in the liquid state of abegation in the tanks; this liquid will be under a pressure of approximately 1,200 pounds per square inch, which pressure changes with the temperature of the cylinder. As the surrounding temperature increases, so does the pressure, and for this reason it is always desirable to keep the tank in a cool place. The fact that carbonic acid is stored in liquid form is an assurance that the capacity of a relatively small tank will be capable of inflating a set of tires a considerable number of times.

Accessories to the Fuel System—Gasoline is hungry for water, but the water should be separated out in the process of filling the fuel tank; foreign substances should also be removed. Funnels are made for the purpose, including a fine mesh sieve and a chamois skin water separator. The chamois skin will permit gasoline to pass through readily; not so with water. Likewise with the water-cooling system, foreign substances should be excluded if the chamois skin is demountable; the same funnel plus the sieve will serve to exclude foreign substances from the water.

The Utility of Shock Absorbers—Classing shock absorbers as accessories it is even so desirable to emphasize their utility. No matter how good the spring suspension may be, there are conditions under which shock absorbers will pay for themselves by aborting spring breakages. And they have other advantages, among which we might mention a greater average speed on ordinary roads and more agreeable conditions of riding. Then, again, tires are not subjected to such great strains if the bouncing of the body is restrained. It is difficult to estimate the saving in tires due to the presence of shock absorbers. Shock absorbers are made in a variety of types, and it would seem from the extended use of the several types that utility resides in all.

Importance of a Signal System—The approach of a car should be heralded in a suitable manner, and this is only possible if a siren, horn or other suitable equipment is provided. Ethie-

ally too much noise is objectionable, but there are conditions under which the right kind of noise in considerable volume will be justifiable. This important branch of the automobile accessory situation is admirably represented in divers ways with sirens, horns, etc., in great profusion. It is not believed the muffler cut-out should be regarded as a suitable noise system because it is not specifically placed with the idea of signaling the approach of a car and pedestrians might not pay attention to the noise of a muffler cut-out because of its non-specific character.

Measurements of Speed and Distance—It is extremely important to be able to ascertain the speed at which a car is traveling. The autoist cannot tell if he is violating the speed laws if he has no means by which he can determine the speed at which the car is going. Barring instinct, it is impossible to estimate the distance in which the car can be stopped without knowing how fast the car is traveling. The distance in which motion can be arrested, if a traction system is involved, follows a natural law; in other words, the motion of a car can be arrested within the distance a car can be accelerated if the maximum tractive force is a maximum during the period of acceleration. Obviously the accelerating rate cannot exceed a certain point because the tractive force of wheel is limited. Equally true, the rate of minus acceleration is limited by the ability of the traction wheels. Instinct serves very nicely in the absence of instruments of precision with good judges of distance, but the automobile is used by people who are not good judges of distance, and it is desirable that they utilize the speedometers in order that they will know how fast they are traveling at any given time. It is also well to know the accumulated distance the car may have traveled, and it is a decided advantage to be able to ascertain at any given moment the distance traveled on a trip. These matters are all taken care of by competent speedometers geared to the front wheels of cars with the dial of the instrument located to intercept the eye of the autoist.

Accessories to Personal Comfort—Until windshields are made a regular equipment in connection with bodies of automobiles they will have to be classed with accessories. As a matter of fact, these same windshields come pretty near to necessities, and it is pleasurable to note that they may now be had in several forms, serving well their intended purpose.

Coming down to the more nearly personal questions, there is the question of goggles. They should be close fitting, easily adjusted, and they should stay adjusted. There are divers forms of goggles, some of which embody the mask idea, and the selection is largely up to the personal ideas of wearers.

There is one other question which is probably overlooked by autoists of no great experience, i. e., the matter of wraps and robes. The way to keep comfortably cool on a hot summer's day is to ride at a fair rate of speed in an automobile, but under conditions of inclement weather it is plain to be seen that the very fact that one can keep cool on a hot day indicates that one will be cold on a cool day. Lap robes and other wraps are, therefore, extremely important and, strange as it may seem, the old conventional idea in connection with the horse-drawn vehicle were found valueless for the purpose. The wearing apparel in connection with automobiles was not reduced to its present form merely at the behest of a style maker. It was found necessary to depart from the conventions in this respect in view of the conditions wrought. Rain seems to have the special property of getting through everything but a thatched roof, and this property of rain is much accentuated when reference is had to automobiles in a storm of this character. A provision by way of storm curtains and waterproof wearing apparel is something that is overlooked sometimes, but it is of the utmost importance.

There is one other matter that augurs for personal comfort, i. e., a timepiece is generally placed on the dashboard so conveniently situated as to enable the occupants of the car to tell the time of day at will. This may seem to be a matter of no

great moment in view of the universal use of watches, but it must be remembered that a watch is rather inaccessible under a top coat, especially if one has gloves on. It is much easier to glance at the timepiece on the dashboard. In town cars and in limousines the timepiece is placed flush in a case accommodating letter paper, pens, ink, blotter, etc.

In some notable instances cabinets are included.

Everything but the auto includes a vast list, the mention of which requires a catalogue. In the meantime it is fair to say that some of the accessories, so-called, are as necessities. Windshields, for illustration, can be regarded as accessories, and yet without them speed is even disagreeable. On a rainy day without a windshield it is impossible to keep dry, and if the road is dusty the windshield is necessary to safety. If goggles are used, and they are of a suitable design, the question of "insects" reduces to the tolerable, although windshields and goggles are more nearly in accord with the requirements.

If the day is cold, steering becomes a task, since the wind will make its way up one's sleeves in the absence of gloves, or with them if the gauntlets are not so shaped as to go over the coat sleeve. Storm and cold protectors are to be had in the various designs as dictated by experience, which, together with fur-lined "over-pants" and such other means as are now available, renders winter touring pleasurable. Coats with flaps and button edges serve well their purposes, and military chestcoats are as good for the autoist as they proved to be in the service of the military.

If the weather is inclement, or if the roads are bad, it is then that tire chains show well their advantages. In the absence of, or even with chains, the several forms of "non-skid" covers are well worth the careful attention of the discriminating autoist.

But if it is desirable to be able to travel in bad as well as in good weather, over rough as well as poorly kept roads, it is equally well to know how far you go. The available instruments of precision to be had are as reliable as any device can be and they serve well the intended purpose. They not only tell the tale of the total distance for the car, but they tell of the individual trips and give the instantaneous value in the rate of travel in miles per hour. These instruments are in nice form, ornamental in design, dust proof, durable and in cost to suit various pocket-books. In these days when tires are guaranteed as to the mileage, to be able to realize the advantages of such guarantees it is necessary to use instruments such as will tell the mileage, since the makers of tires are wont to deduct the value of the service rendered in adjusting accounts. In general, it is also possible to determine the service that tires are capable of rendering, and it is also possible to note if the car adjustments are in order, since by noting the gasoline consumption per mile of travel—or the miles per gallon of gasoline—it is easy enough to be able to determine if there is a falling off in the service, and the cause of the falling off then can be sought.

In connection with the ignition system there is the question of the batteries and means for determining if they are charged or exhausted. For this purpose there are volt-meters and other forms of indicators that are well worth having. As for the batteries, there are diverse forms in both "dry cells" and "storage" types. Some of the storage batteries have "electrolyte" of a non-fluid character, and all are sealed. In this way the batteries are protected from contamination, which is a matter of the greatest importance. Of battery boxes there are various types and sizes to go on the running board, or they may be placed where fancy dictates.

On the whole, the accessory situation is in a most healthy state, and while improvements are being made with a good showing of regularity, it is a fact nevertheless that the autoist has but to call upon his supply man for what he wants, no matter what it may be if it is of any value such as would be likely to generate a demand.



The Price Short Length Automobile Glove is a favorite for drivers who do not want a gauntlet cuff. It is fitted with a solid leather snap-strap at wrist and may be had either lined or unlined. Price \$2.00 to \$4.00 per pair.

The Price Automobile Gauntlet possesses a number of exclusive points of superiority over other makes. Longer in both glove proper and gauntlet cut, the latter is not only wider when closed, but is, as well, fitted with a folding gore which unclasps to admit the most bulky overcoat. It is the only gauntlet made which is specially reinforced where the wear comes between the fingers and around the thumb. The wrist has a solid leather snap-strap. Lined or unlined. Price from \$2.00 to \$10.00 per pair.

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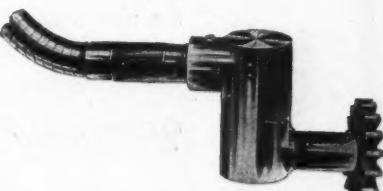
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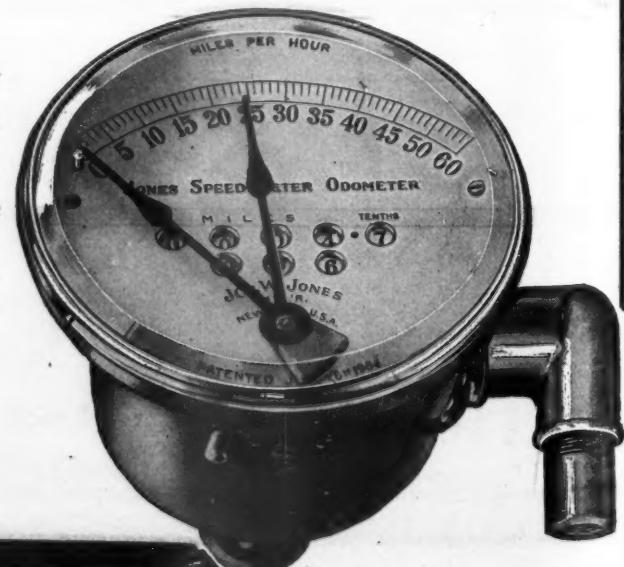
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Simplicity—few parts.

Strength—strain comes on all parts evenly.

Ease—lever turns screw only—doesn't lift direct.

Holds at any point—doesn't drop if you let go.

Small and compact. No loose parts to lose.

Easy to reverse. (Just touch ratchet.)

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Etc., etc., etc.

Vs.

Rack and Pawl Jacks

Complication—many parts.

Strain comes on small parts, teeth, etc.

You actually lift load yourself by leverage.

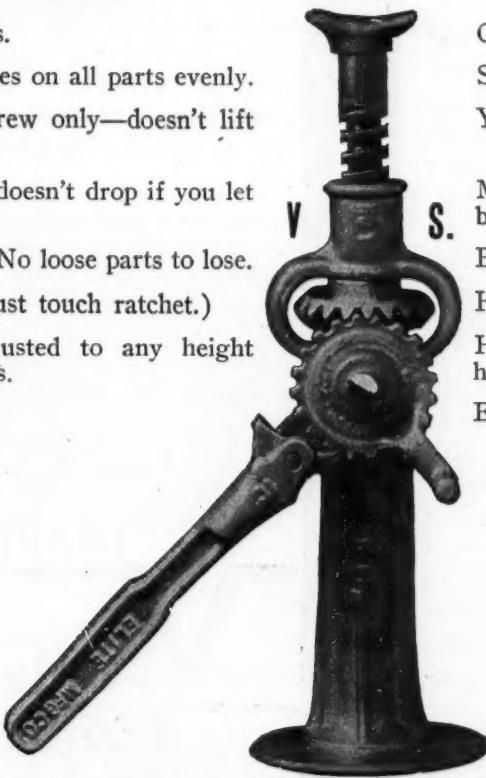
Must be lifted from tooth to tooth. Drops back if teeth fail to catch.

Bulky—handle always loose or separate.

Hard to reverse (sometimes impossible).

Hard to raise or lower, without soiling hands.

Etc., etc., etc.



The Reliable Jacks

We manufacture a complete line of automobile, vehicle and heavy lifting jacks—six different models, all equally good, and all the best that are made for their purpose. Prices from \$2.50 to \$15.00, and with capacities from 2 tons (4,000 lbs.) to ten tons (20,000 lbs.). Familiarize yourself with this line of jacks, or with the one that fits your use. See them at the Automobile Show, at your supply dealer's, or write us for literature and prices.

THE ELITE MANUFACTURING COMPANY
ASHLAND, OHIO

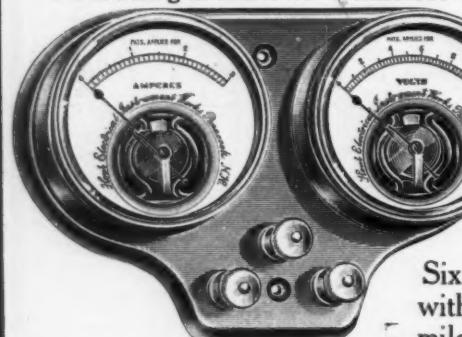
THE HOYT

ELECTRICAL
INSTRUMENT WORKS
Penacook Station, N. H.

SPECIALTIES For 1909

The Hoyt System of Testing Ignition deserves your careful consideration when choosing your 1909 equipment: first, because it enables you to increase the efficiency of your motor; and second, because it diminishes the cost of operating your Auto or Motor Boat by saving your gasoline, batteries and coils.

A leading Banker of Tennessee writes us that



he made 1025.3 miles on a set of 6 Columbia Dry Cells in his Stevens

Six as compared with 75 and 250 miles on the two

sets used previous to installing the Hoyt System.

A prominent official of the Virginia Polytechnic Institute writes: "I received the 225 Voltmeter, and found it a fine instrument. It was no time in showing me that one of the units in my coil was about broken down."

We have received hundreds of letters of similar character. Can you afford to overlook such testimony?

The Triune is a Pocket Voltammeter made for those who appreciate quality.

Bulletin MA describes both of these.



Vanguard Automobile Accessories

Lead in Quality
and Price

Wind Shields
\$35
Bumpers
\$12



The progressive automobile manufacturer has reduced his prices and increased his output of cars and we are going to follow suit. We have increased our facilities and contracted for material for the manufacture of ten thousand folding, plate glass Wind Shields and half that number of Bumpers, and we are now ready to meet all demands, large and small.

We have the necessary Capital and confidence in the Automobile situation to go into the manufacture of these Automobile Specialties on a large scale. This puts us in position to place on the market the best Wind Shields and Bumpers ever produced at from 25 to 50% less than before.

Wind Shields \$35 Bumpers \$12

Our line of accessories is marketed under this trade mark.

TRADE MARK

VANGUARD
REGISTERED

We have profited by past experience and we have reached absolute perfection in these Wind Shields and Bumpers, while our new "Vanguard Spark Plug," for which U. S. and Foreign patents are pending, will prove a sensation.

Visit our exhibit at the Automobile Shows in New York and Chicago. We invite critical inspection and you will witness a most interesting demonstration.

Write for our new catalogue and a handsomely illustrated booklet "Way Ahead"; it contains instructive and valuable information. Terms and discounts to dealers on application. Write today!

Vanguard Manufacturing Company
108 Cass St., Joliet, Ill.

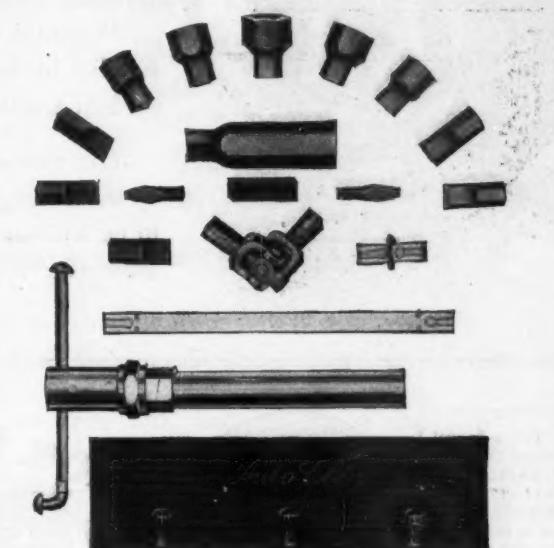
**THE STANDARD SOCKET WRENCHES OF THE WORLD
ALSO SOCKETS MADE FROM COLD DRAWN STEEL
THE AUTO CLE**



THE AUTO CLE
LARGE SET
SOLD BY ALL DEALERS
DISTRIBUTING AGENTS.
FACTORY SALES CORPORATION, CHICAGO.
FRANK MOSSBERG CO., ATTLEBORO, MASS.

PACKED IN NEAT WOODEN BOX, 30 STEEL SOCKETS,
RATCHET HANDLE, SWIVEL JOINT,
SCREW DRIVERS, ETC.

FITS ANY BOLT—REACHES ANYWHERE. THE BEST ALL
AROUND WRENCH FOR SHOP
OR GARAGE



SMALL SET IN NEAT LEATHER CASE, 11 STEEL SOCKETS.
PUT ONE IN YOUR CAR



TITUS CLE
MANUFACTURED BY
QUINCY MANCHESTER SARGENT CO.
PLAINFIELD, N.J.

DISTRIBUTING AGENTS
THE FRANK MOSSBERG CO.
ATTLEBORO, MASS.
FACTORY SALES CORPORATION

**AUTO CLE'S LITTLE
BROTHER**

THE TITUS CLE WRENCH

NEW AND NOVEL

A SIMPLE FOLDING SOCKET WRENCH, COMPACT,
CONVENIENT AND EXTREMELY
USEFUL

ASK YOUR DEALER

Manufactured by

QUINCY MANCHESTER SARGENT CO., Plainfield, N. J.

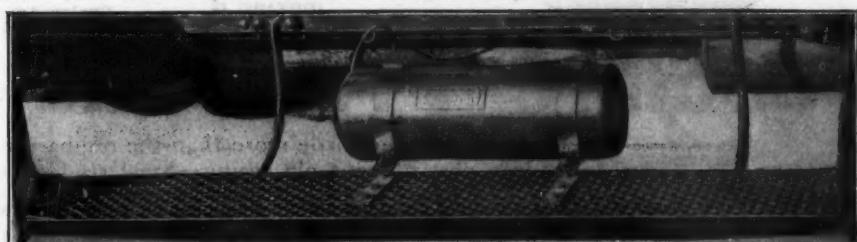
Distributing Agents

East: FRANK MOSSBERG COMPANY, Attleboro, Mass.

West: FACTORY SALES CORPORATION, Chicago, Ill.

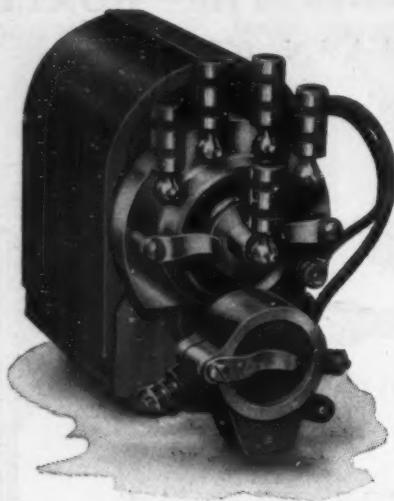
**A STEP IN THE RIGHT DIRECTION
INSIST ON HAVING THE STANWOOD**

FURNISHED AS REGULAR
EQUIPMENT ON MANY OF
THE HIGHEST GRADE
AUTOMOBILES MADE IN
THIS COUNTRY.



Sole Agents: FACTORY SALES CORPORATION, Chicago, Ill.

SEE OUR EXHIBIT AT THE GRAND CENTRAL PALACE, SPACE 335



WE ARE THE LARGEST JOBBERS OF AUTOMOBILE SUPPLIES

We carry in stock at all times the most perfect assortment of automobile supplies in the United States and your orders can be shipped promptly and the best attention given them owing to our large stock.

Our new catalog system is of the loose leaf form. It has been indorsed by the leading dealers and manufacturers in the trade. You can not afford to be without this on your desk. We keep it up to date for you. This is something new. Write for a general description of it and be convinced.

Our Flyers are issued to you Monthly

Try a barrel of our Genesee Lubricating Oil. It is a Brand. This oil is practical for any kind of weather and will meet with approval with your trade.



We will extend you courteous and generous treatment at all times. We respectfully solicit your valuable patronage.

Flint, Mich.



**SAVE MONEY
ON
OLD TIRES**

**A
TRIPLE-
TREAD**
IS GUARANTEED

to add 3000 to 5000
miles to your old tire,
making it



Cross Section
of Tire
Equipped with
Triple Tread

Puncture Proof and Non-Skid

These treads cost very little more than the ordinary rubber retread, are made a part of your old casing—Steel studded—3-ply leather.

GUARANTEED PUNCTURE-PROOF

Designs and workmanship right. Call or write us for terms and detailed description.

Triple-Tread Auto Tire Mfg. Co. Phone Calumet 2456 1545 Michigan Ave., Chicago

EDISON SPARK PLUGS

ONE YEAR'S SUPPLY OF EDISON SPARK PLUGS
FOR YOUR MOTOR BOAT OR AUTOMOBILE FOR

One Cylinder.....	\$ 1.75
Two Cylinder.....	3.50
Three Cylinder.....	5.25
Four Cylinder.....	7.00
Six Cylinder.....	10.00

If you enclose the amount required we will supply you, without any further charge, a full year's supply of Edison Midget Plugs.

If you desire Edison Double Plugs add two dollars to the above amounts.

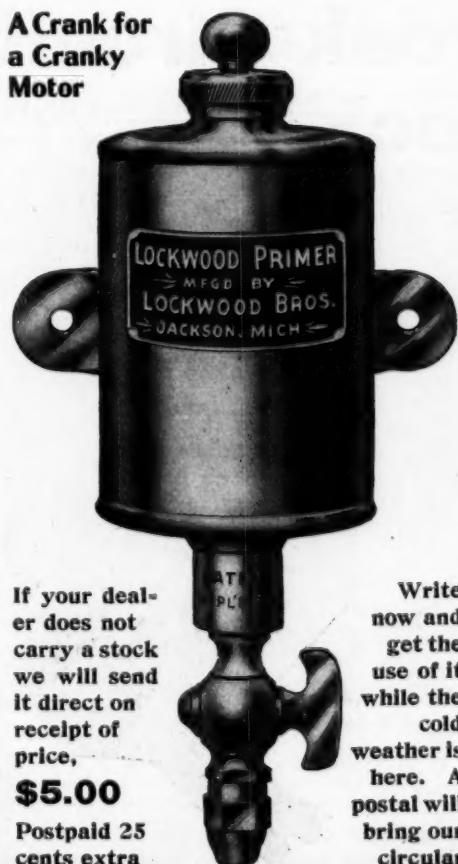
This is the greatest spark plug offer ever made and everyone should take advantage of this exceptional offer.

The name EDISON is behind each and every plug we send out, and that is a guarantee accepted the world over.

EDISON AUTO ACCESSORIES COMPANY

49 Christopher Street
NEW YORK

A Crank for
a Cranky
Motor



If your dealer does not carry a stock we will send it direct on receipt of price,

\$5.00

Postpaid 25 cents extra

Write now and get the use of it while the cold weather is here. A postal will bring our circular

The Lockwood Primer

When you start your car in the morning, do you crank your head off?

The man who is tired of needless work on the dangerous end of an automobile is the man we want to talk to.

If you were sure you could start your motor so easily that it would be a positive pleasure, you wouldn't hesitate in having a primer put on.

We will guarantee to satisfy *you*, and will give you 30 days to try it. If it doesn't come up to your expectations, return it, and we will refund your money.

Now, Mr. Man, this is not "Bunk." We know it will work to *your* entire satisfaction on *your* car.

If for any reason you do not want it, all you have to do is return it inside of 30 days and you will get your money by return mail.

**Lockwood Bros., 103 Pearl Street,
JACKSON, MICH.**

GABRIEL 1909



GABRIEL
TRADE MARK
GABRIEL HORN MFG. CO.
CLEVELAND
PATENTED OCT. 24, 1905.
OTHER PATENTS PENDING

In order to maintain the high standard which the products of our factory have acquired, many improvements have been made in the 1909 models of The Gabriel Horn, The Gabriel Shock Absorber, and The Gabriel Cut-Out Valve. Gabriel products still set the pace which competing lines try to follow.

A POLITE REQUEST



poses can be caused to rise in unison for a penetrating warning on country roads. The Gabriel Horn is used exclusively on the personal cars of King Edward of England, Emperor William of Germany, and other crowned heads of Europe.

1909 GABRIEL HORN and CUT-OUT VALVE

We have perfected a new valve which is used both for operating exhaust horn and for cut-out purposes. For cut-out purposes, remove the disc in main channel, thereby relieving back pressure from muffler through additional opening of $1\frac{1}{4}$ in. Made to fit exhaust pipes 1 in. to $2\frac{1}{2}$ in. outside diameter. Warranted to not stick under any conditions.



GOING UP

is pleasant enough, but coming down with a thud is what makes the nerves quiver and cry for

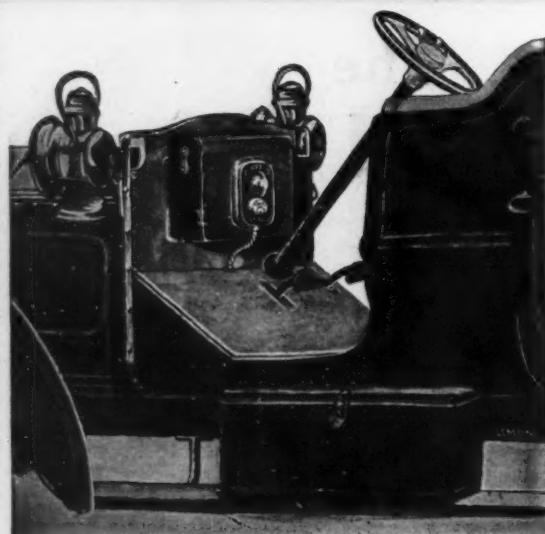
1909 GABRIEL SHOCK ABSORBERS

A retarding friction gradually applied in proportion to the shock takes up all jolts and jars, and makes riding over rough roads or bumpy pavements a positive pleasure. The 1909 Model has improvements which give increased bearing surface, eliminates noise or rattle and greatly increases its efficiency and durability. Therm-mold used for friction pad. Can be attached to any car or any type of spring.

Write for booklet illustrating and describing our 1909 Products

GABRIEL HORN MFG. CO.

1415 E. 40th St.
Cleveland, O.



GASOLINE CAR LOCK INSTALLED

The cut to the left of this page shows the neat and inconspicuous position in which the switch is installed on the coil box, doing away with the old switch entirely.

The Break Circuit Auto-Lock

is going to feature largely in the sale of 1909 cars

This is the first absolutely practical Lock-Switch that has ever been put on the market, and must not be confused with those devices which can be easily wired around or short circuited. This Lock is so constructed and installed that it cannot be "fooled with."

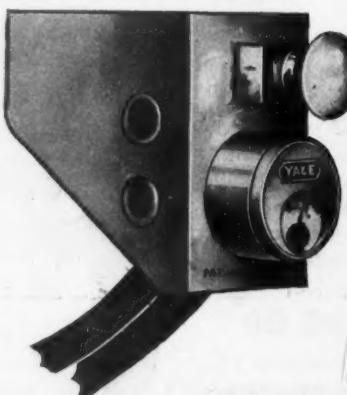
The cut to the right represents our lock for electric vehicles which is installed on arm of seat in place of the ordinary cut-out or plug. INSIST ON HAVING YOUR NEW CAR EQUIPPED WITH ONE OF THESE DEVICES.

SAFETY DEVICE CO., Mfrs., Indianapolis, Ind.

BRANCHES:

Skinner & Skinner, Chicago.
Herbert F. Reid, Cleveland, O.
G. L. Wands, Savoy Hotel, Denver.
A. A. Duebel, 154 Ellicott St., Buffalo. (State Agent.)

H. I. Sackett Electric Co., Buffalo, N. Y. (Erie County.)
F. E. Spelman, 127 Warren Ave., Boston, Mass.
Geo. A. Deckert, 614 Elight St. So., Minneapolis.
M. H. Cormack, Motor Mart Bldg., New York City.



"THE STAR"



Scale 50 Miles Price \$25.00 Style No. 960

The best popular priced Speedometer on the market. We give 30 days in which to prove it. Write for Catalogue and full particulars.

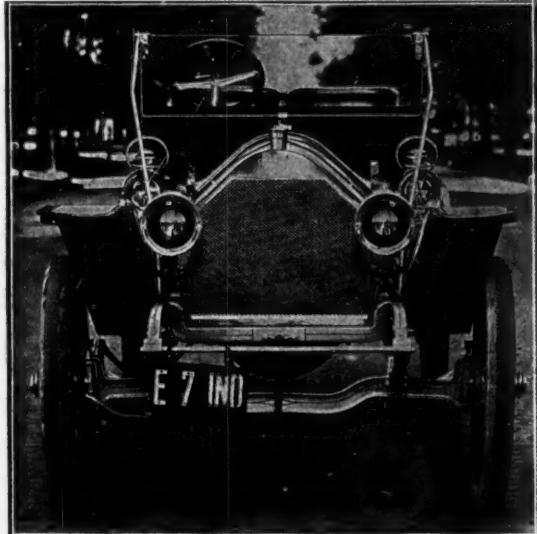
STAR SPEEDOMETER COMPANY
DANVILLE, PENNA.

New York City, 1679 Broadway. Boston, Mass., 222 Eliot St.
Philadelphia, Penna., Geo. W. Nock Co., 126 N. 4th St.

WE ARE AFTER THE TOP AND WIND SHIELD BUSINESS

How many prices are you paying for these things?

WE SELL THEM FOR LESS

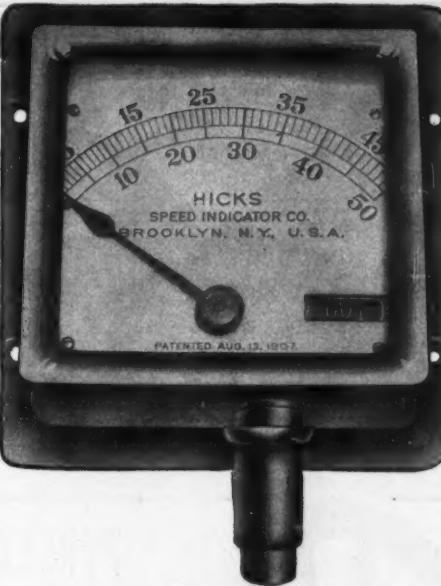


OUR "IDEAL" LOWERED

Cut to fit any dash, delivered anywhere in U. S. List
Best quality Touring Car Tops complete, \$27.50
Best quality Runabout Tops complete, \$60.00
Best quality Runabout Tops complete, \$35.00

Dealers, Write for Samples, etc.

JENKINS SPECIALTY MFG. CO., Sumter, S. C.



FROM FACTORY TO YOU
SAVE THE MIDDLEMAN'S PROFIT ON

The Hicks Speed Indicator
BUY DIRECT FROM THE MAKERS

\$15 FOR THE
\$25
INSTRUMENT

\$25 FOR THE
\$50
INSTRUMENT

MAXIMUM HAND, \$3.00 EXTRA.

ELECTRIC LIGHT INSIDE CASE, \$5.00 EXTRA.

The Cheapest Prices at Which High-Grade, Accurate and Reliable Speed Indicators Were Ever Sold

The Hicks Speed Indicator is two well known and by long and successful service its reputation is too well established to need comment. There is no better or more reliable indicator made anywhere at any price. These are proven facts. On the market since 1905 and not 2 per cent ever returned for repairs. One of these speedometers has been on a New York Central engine since January 1st and traveled over 20,000 miles without any breaks or repairs whatsoever. Written guarantee with every instrument.

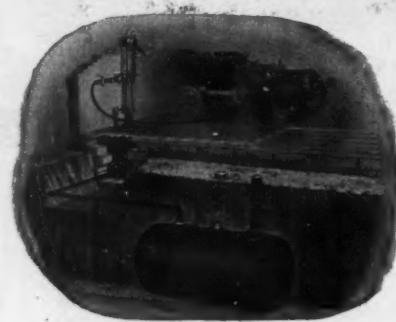
An opportunity for money-saving you should not miss.

In ordering, give make, year and model of your car.

Terms: Cash with order, or C. O. D. if order is accompanied by 10 per cent deposit. **ORDER TODAY.**

LONG ISLAND AUTO SUPPLY MFG. CO.
Office and Factory, 1263 Atlantic Ave., Brooklyn, N.Y.





Cut 41. Long Distance Outfit. The Standard Garage Equipment for Gasoline Storage

Better Gasolene for Less Money

If you could run your car farther with less gasoline, and pay less for what gasoline you do use, wouldn't you do it? This may sound impossible, but it is easily done. Just get a

BOWSER GASOLENE TANK

The Bowser enables you to safely store gasoline in large quantities so you can pay wholesale prices. Then, the Bowser keeps the gasoline for you just as strong and powerful as when it left the refinery, giving you more power per gallon than gasoline stored any other way. Aren't these points worth looking into?

Send a postal for Catalog 7. It is full of automobile pointers.

S. F. BOWSER & CO., Inc. **FT. WAYNE, IND.**
235 Atlantic Ave. 50 Church St. Fisher Bldg. 612 Howard St. 66-68 Fraser Ave.
Boston. New York. Chicago. San Francisco. Toronto.

**PERFECTION
NON-SKID
CLIMBERS**

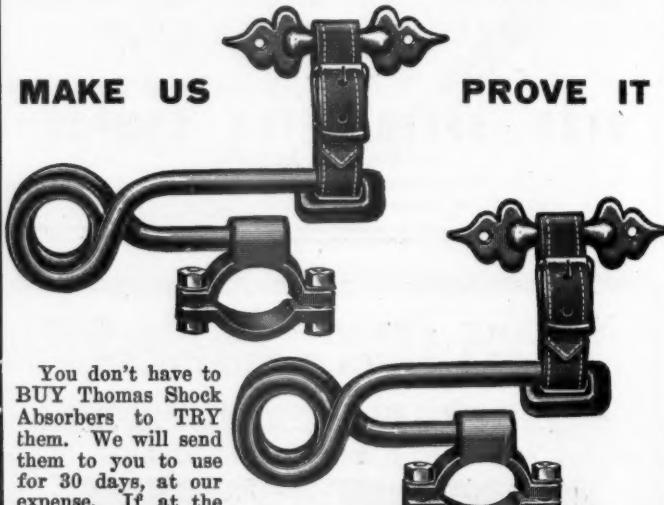
are ideal for all kinds of tires. PERFECTION Climbers outwear any two sets of climbers made. They cannot cut the tires and they will not slip because they are round and smooth next the tire and all roughness next the road.

The one great necessity for Winter travel. They help to climb. They never slip.

Write at once for valuable information.

Perfection Non-Skid Climber Co., Edon, Ohio

Thomas Shock Absorbers Prevent Springs Breaking!

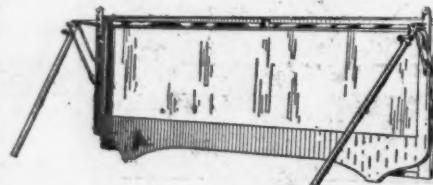


You don't have to BUY Thomas Shock Absorbers to TRY them. We will send them to you to use for 30 days, at our expense. If at the end of that period you do not believe that they positively eliminate upthrow, thus ensuring easier riding—more speed—less wear on tires—NO BROKEN SPRINGS and fewer repairs—just send them back. Could anything be fairer? Can we make our guarantee stronger? Remember you have nothing to lose—everything to gain. Send for full particulars—they are worth real money to you.

Buffalo Specialty Co., 380 Ellicott St., Buffalo, N. Y.

THE KNIGHT SHIELDS FOR 1909

You see them everywhere on all makes of cars



Folding and Drop

are absolutely perfect in design, construction

GUARANTEED

Write for descriptive matter or call and see them

PRICES RIGHT

Please mention make of car when writing

FRED. H. KNIGHT, 1221 Michigan Avenue, CHICAGO, ILL.

THE WARNER AUTO METER

GUARANTEED ABSOLUTELY
ACCURATE

Is the only speed indicator made on the Magnetic Induction principle. Because of the principle it accurately indicates every range of speed from zero to limit of speed.

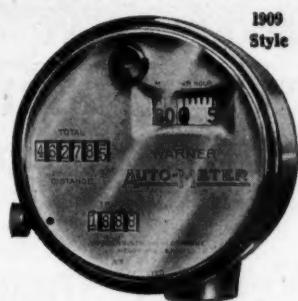
All other instruments are made on the centrifugal principle. They fail to indicate any speed whatever under 5 to 10 miles per hour.

The Auto-Meter is so durably made that practical tests have shown that it will endure a MILLION MILES of riding without perceptible wear, or departing from absolute accuracy more than 10 feet to the mile. In the Glidden Tour Centrifugal instruments lost up to 34 per cent in accuracy during the trip.

We invite comparative tests. Before you decide on any Speed Indicator, put the auto meter on one side of your dash and any other indicator at any price on the other. Then use your watch over a measured course. Keep the instrument which tells the truth. We know which it will be.

WARNER INSTRUMENT COMPANY

Factory and Main Office: 344 Wheeler Avenue, Beloit, Wis.
Address your request for Free Trial to our nearest Branch House:
NEW YORK, 1802 Broadway.
BOSTON, 925 Boylston St.
PHILADELPHIA, Cor. Broad and Race.
PITTSBURG, 3432 Forbes St.
CLEVELAND, 2062 Euclid Ave.
BUFFALO, 722 Main St.
LOS ANGELES, 1212 S. Main St.



Veeder

"It's Nice to Know How Far You Go"

VEEDER ODOMETERS

are the only time-tried instruments that will show distance traveled. They demonstrated their superiority years ago and have maintained it. They are the only permanently accurate, mechanically correct, and "fool-proof" odometers made, and thousands more are in use than all other makes put together. Supplied in convenient form for every vehicle.



FOR AUTOMOBILES: From \$10.00 to \$20.00, with all fittings complete to attach to any make of car. Give size of wheel and model of car when ordering.

FOR HORSE-DRAWN VEHICLES: From \$8.50 to \$9.00, with fittings complete for all vehicles and all wheel sizes. State size of wheel used.

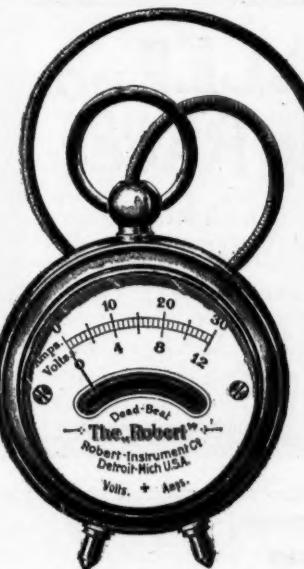
FOR BICYCLES AND MOTORCYCLES: Veeder Cyclometers from \$1.00 to \$2.50, ready to put on. Give wheel size.

THE VEEDER TACHODOMETER

\$50.00 for automobiles, registers distance, both "trip" and total, and shows speed at all times. Scientifically and permanently accurate. Only one moving part. No Springs.

THE VEEDER MFG. CO.
25 Sargeant St. Hartford, Conn.

CHICAGO OFFICE = T. H. Cranston & Co., Agts., 58-60 Wabash Ave. Phone, Central 3615. Represented in Great Britain by Messrs. Markt & Co., Ltd., 6 City Road, Finsbury Square, London, E. C., England.



Our Pocket Combination Volt-Ammeter

Electrical Instruments

That are accurate and always on the job. The most perfect electrical measuring instruments on earth whether large or small. Our pocket instruments are the most wonderful bits of mechanism ever constructed.

ROBERT'S INSTRUMENTS

STAND UNSURPASSED AND WE CAN PROVE IT. LET US SEND YOU A CATALOG WHICH WILL BE OF INTEREST AND VALUE TO YOU

ROBERT INSTRUMENT CO.,
56 SHELBY ST., DETROIT, MICH.

Look
Read
\$15



PEERLESS SPEEDODOMETER

with a 3" speed dial and hand indicating from one to sixty miles, 10,000 season and 100 mile trip odometer complete with everything ready for attaching, \$15.00; with maximum hand, \$18.00.

This Exceptional Offer

for advertising purposes on our regular \$30.00 instrument holds good until December 31, 1908.

Refer to this adv. and send with order, as we will sell only one instrument to a customer at above price. State make and model of car, with size of tire, when ordering.



Saves 25 per cent on your gasoline bill. Prevents backfiring. Send for circular and get posted.

PEERLESS SPECIALTY CO.

1876 Broadway, New York

WHY
stick to any make of

**Wind
Shield**

offering one or two
Patterns?

Our line now consists of

8 Models

TRADE MARK

**THE FAMOUS
TROY
LINE**

8 Models

MAKE CERTAIN
a visit to our big exhibit
at Grand Central Palace
and Madison Square
Garden Shows.

**THE
Troy Carriage
Sun Shade Co.**

Dept. M
TROY, OHIO

Our New No. 7—The Best Out

"New Light Six"

ANNOUNCEMENT — SEASON OF 1909
**The Randall - Faichney
Company**

beg to announce that they have secured the sole right to
manufacture and sell the patented

Webster Gasoline Gauge

which will hereafter be marketed as a Randall-Faichney
product in conformity with their established policy of
offering *only high grade specialties*.

The improved Webster Gauge marks a new era for the
user because of reliable service and to the dealer because it
can be instantly applied to all cars.

B - Line Oil Guns

are now recognized as standard equipment for all cars. We
invite correspondence from manufacturers and will be
pleased to quote prices on both of these specialties.

Jobbers should send for prices and electros for their 1909
catalogues.

Address all correspondence to

**The Randall - Faichney Co.
Boston, Mass.**

Sole Manufacturers of the B-Line Guns and Webster Gauges
We shall exhibit at the Madison Square Garden, Central
Palace, Chicago and Boston shows.

THIS MAN PAID
\$10.00 and was more than
satisfied. With the
Price Now \$5.00
Just think how well you
ought to be satisfied!

**THE LITTLE
STEERSMAN**

will guide your car
through rough roads,
avoid mud and slush, with
no more effort than ordi-
narily required on boulevard. It has many warm friends, as will
be shown on receipt of a postal bearing your name and address. We
have testimonials praising every quality, from people whose word is
absolutely reliable. Don't take our word for it, but get theirs. Then
we are sure you will want the **LITTLE STEERSMAN**.
It's better than life insurance because it saves the life instead of paying for it.

THE ABRAMS-MASON CO., **CHATHAM, N. Y.**

Chatham, N. Y., Jan. 10, 1908.
The Abrams-Mason Co.,
Chatham, N. Y.
Although your kindness to use
the "Little Steersman" spring ex-
tends three weeks longer under
your 30 days' agreement, I want to
say that you may keep my \$10.00
and welcome. It is the most mar-
velous contrivance ever invented.
It saves in comfort and lack of
worry its price every time I run
my car. Very truly,
E. B. REYNOLDS.

FOR SALE!!
60 H.P. Cup Racer

Also all kinds of AUTO, TRUCK
AND MOTOR BUGGY SUPPLIES

Automobile Supply Dept. of the
BAUM IRON CO.

1222 Harney Street

OMAHA, NEB.

UNIVERSAL AUTO-TIRE REMOVER

Best, Simplest and
Strongest Ever
Invented.

For Goodyear, Standard Universal, and
Goodrich Quick Detachable, Clincher,
Fisk, Marsh, or Dunlop
Tires and Rims.

Adjustable to any sized
tire. Adaptable to any
pattern rim or ring.

948 MARKET ST., (ROOM 412)
SAN FRANCISCO

Price, 3 Dollars. Length, 20 inches. Wt. 4 Lbs.

**HALF
PRICE**

TO CLEAN UP SURPLUS STOCK

Semi-Annual CLEARING SALE

Of Automobile Supplies and Accessories

Send for Flyer No. 18

Neustadt Automobile & Supply Co. 3953 Olive Street
ST. LOUIS, MO

THE
ECHO HORN
FOR GASOLINE AND STEAM CARS

THE ECHO HORN COMPANY, Dept. "B" 5601 Carnegie Avenue, Cleveland, O.
Factory Sales Corporation, Western Distributors, Chicago, Ill.

STOP GUESSING



Pat. App. See
demonstration
of
Indicator
and
Valve
Grinder at
Palace Show,
Dec. 31st.

BROWN

Tire Pressure Indicator Automatically and accurately measures pounds inflation carried. Operated simply by screwing into tire nipple. Recommended by tire manufacturers generally. Price, \$3.00.

THE BROWN CO.
519 E. Water St. SYRACUSE, N. Y.

MAPLE CITY MFG CO.
MONMOUTH, ILL.

**DON'T WAIT FOR
OIL TO RUN**

The famous Howland Pump Oiler forces oil to the bearings quickly and surely. Parts detachable and interchangeable. Recommended and used by best manufacturers. Send for styles and prices. You can't afford to be without one.

THIS IS THE PUMP



**HOWLAND
AUTO OILER**

FORD OWNERS'

SHOULD KNOW ABOUT
Shumard's Front Spring Outfit

Martinsburg, W. Va., R. D. No. 2,
Sept. 23, 1908.
The Special Motor Vehicle Co., Cincinnati, Ohio.

Gentlemen: Replying to your favor of recent date relative to the merits of Shumard's Front Spring Outfit for Ford Runabouts, would say that after a month's use of your springs I would not be without them at ten times their cost.

Advertise your outfit "Money back if you want it," and wear diamonds.
Yours truly, C. A. WEVER.

Hundreds already sold. Finished, painted, and ready to apply. Any one can attach them.

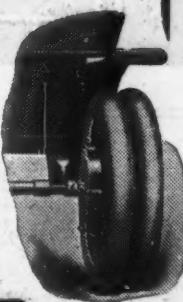
**Vanadium Steel
Brackets and Perches.** Worth twice the price as accident insurance.

Write for particulars.
223 E. 4th Street,
CINCINNATI, OHIO.

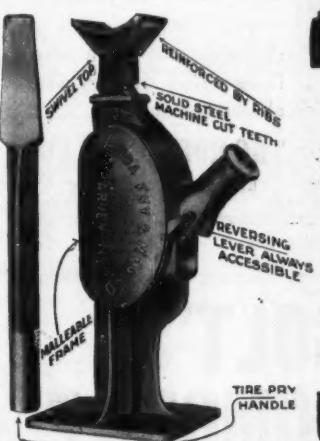
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Best emergency wheel made. Carried equipped with inflated tire, on step or back of car, ready for instant use. Applied without removing deflated tire. Clamps securely to rim of auto wheel. Creeping impossible. Makes no difference in running or steering of car. All standard sizes for clincher or quick detachable tires.



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BUDA
No. 06B
Auto Jack

Everybody now recognizes this to be the best jack made. If you do not insist on getting this jack the fault will be yours.

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Get a set of these jacks, and when you put up your car for the night or for the winter release the tires from the life destroying weight and the rubber destroying oils on the garage floor. It takes 15 seconds.

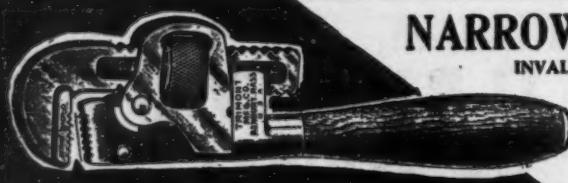
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YOU NEED IT; HERE
IT IS: The only Tread on the market having an ADJUSTABLE TENSION ANCHORAGE. Unlimited TENSION. Always Adjustable. Our Positive ANCHORAGE ELIMINATES TIRE INJURY. A Real PROTECTOR; ABSOLUTELY NON-SKID AND PUNCTURE PROOF. The SAFE AND SANE PROTECTOR for all road conditions. Write today for Descriptive Circular and Prices.

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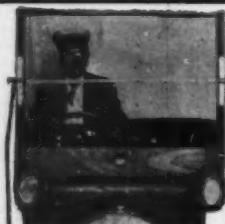
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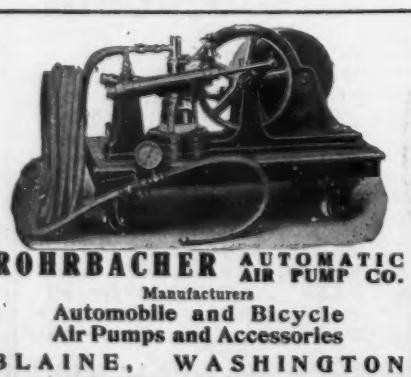
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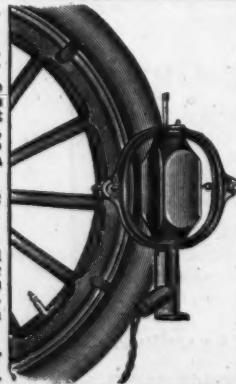
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In testing single cells, the cord
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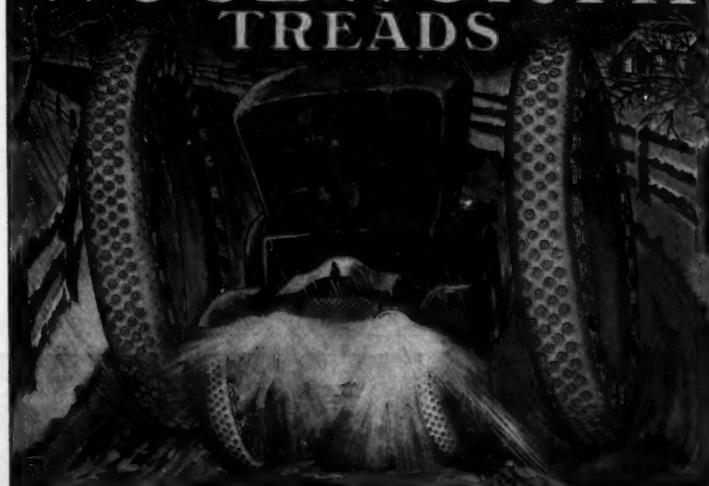
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wears
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The
tension
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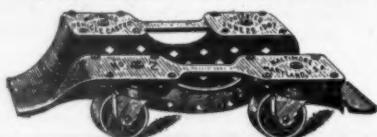
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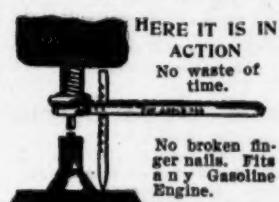
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for throttle and spark levers, connecting carburetor and timer



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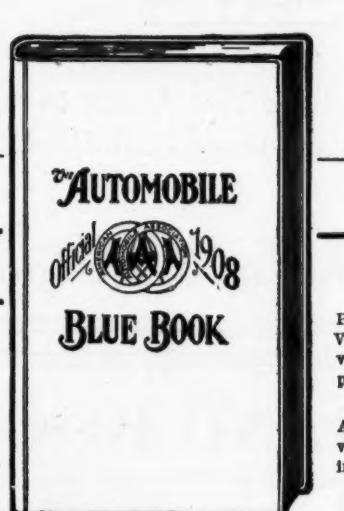
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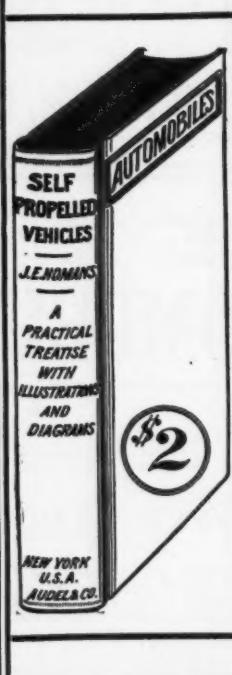


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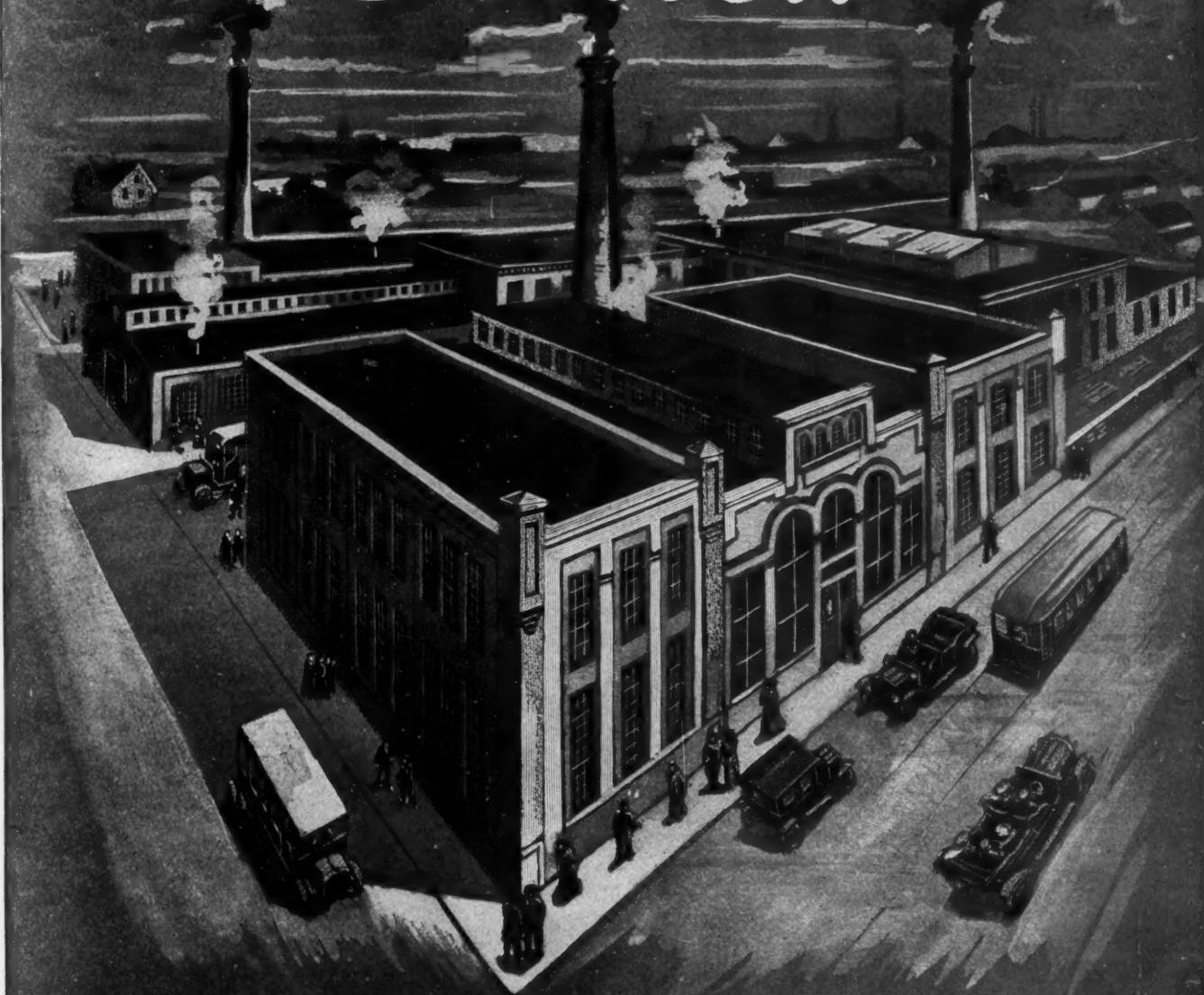
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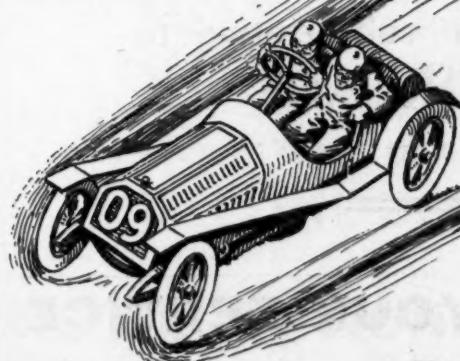
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Leading American Cars—All the
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9th INTERNATIONAL AUTOMOBILE SHOW



Management of
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Would you like a battery that you could exchange when discharged for a fully charged battery with any dealer, regardless of where purchased, by paying 35 Cents per Cell and without the annoyance of delay. Then ask your dealer about it or write us.

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KITSEE STORAGE BATTERY CO.
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“Bullet Proof”

Inner Tube Protecting Webbing, 3 inch,
25c per yard; 4 inch, 40c per yard.

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DECARBONIZER
chemically removes carbon from cylinders, piston valves and rings. Increases Power 30 per cent.
Volatilizes carbon, in which form it passes out exhaust. Injury to metal work impossible. Agents wanted in certain localities. Write to-day for particulars.

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use the
Holley Carburetor

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BLOOMFIELD, N. J.

(Watsegg Station, D. L. & W. R. R.)
John Millen & Son, Ltd.—Montreal—Toronto—Vancouver.

1000 AND 1 THINGS TO DO

That's true of many, but if you must overlook 999 things be sure and remember to renew or re-enter your subscription to :: :: MOTOR AGE :: ::

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TYPE "F" SIX

The Fastest and Highest Powered Stock Car Built in America

A six cylinder car developing 75 horsepower and built on practical not freakish lines so characteristic of speed cars. This latest and most notable addition to the Pennsylvania group will be made only to order and only fitted with four passenger all-metal baby tonneau.

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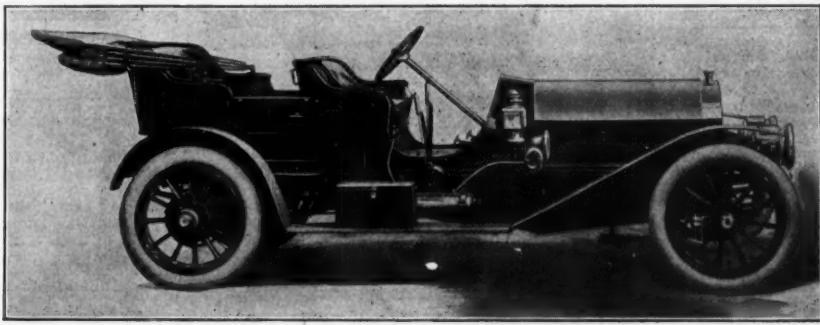
TYPE "C" BABY TONNEAU AND TOURING CAR,	:	:	:	\$3000
Type "D 25" Roadster, \$2000. Baby Tonneau and Touring Car,	:	:	:	\$2100
Type "E 50" Seven Passenger Touring Car, Luxurious Quinby Appointment,	:	:	:	\$3800

"Quinby" equipment can be furnished on any of the above types, in any style, at an additional price. All models equipped with double ignition and gas tanks.

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**GRANT SQUARE
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Type "F" Six Cylinder \$4500

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will not be complete unless you have referred to the CLASSIFIED ADVERTISING DEPARTMENT to be found on Pages N 6, N 7, N 8, N 9, N 10, N 11. The Greatest Classified Advertising Department devoted strictly to the AUTOMOBILE INDUSTRY to be found in AMERICA

NO EXCEPTIONS. IT'S UP TO YOU TO LOOK

CLASSIFIED ADVERTISEMENTS

Cars For Sale

A CLEARANCE SALE, 20 USED CARS, \$125 up; runabout, touring cars, limousines. G. E. Holmes & Co., 1502 Michigan Ave., Chicago.

ACTRESS LEAVING CITY INDEFINITE period will sacrifice handsome stylish double cylinder touring car, cape top, prestolite tank, lamps, horn, etc., \$800; worth double. Mrs. Montgomery Hastings, 137 West 48th St., New York City.

A DANDY 5-PASSENGER CAR, GOOD order and new tires. \$375 takes it. Come quick. Can demonstrate any day, dry or muddy. E. E. Brass, Petersburg, Ill.

AMERICAN AND FOREIGN SECOND- hand cars bought, sold and exchanged. Western Auto Sales Co., 309-10-11 Michigan Ave., Chicago. Telephone Harrison 6680. If you buy an automobile before you look at our stock you will make a mistake.

We have the largest assortment of used automobiles that was ever offered for sale in the West.

Our prices quoted here will convince you beyond a doubt.

1 Stoddard-Dayton, late model.....	\$ 850.00
2 Haynes 60-h.p., top, glass front, 5 lamps	950.00
3 Mitchell 4-cyl., top, glass, front	950.00
4 Mitchell, 1908 Model, 2-passenger, 4-cyl., top	600.00
5 Buick, late model, 4-cyl., top	800.00
6 Columbia, 40-h.p., top, lamps	675.00
7 Queen, 4-cyl., absolutely new.....	1,100.00
8 Dragon Roadster, demonstrator, quite new	900.00
9 The Dart, high wheeler, new.....	350.00
10 Autocar, detachable tonneau.....	200.00
11 Autocar, coupe, good town car.....	400.00
12 Autocar, 4-cyl. Touring Car.....	375.00
13 Buick, quite new, 4-cyl., fully equipped	800.00
14 Baker electric, batteries in fine shape	175.00
15 Columbia, 2-cyl. Touring Car.....	400.00
16 Cadillac, 4-cyl., good shape.....	500.00
17 Cadillac Runabout, top, fully equipped	150.00
18 Cadillac Runabout, late model.....	325.00
19 Cadillac, Model B, fine shape.....	180.00
20 Ford, 1908, like new.....	400.00
21 Ford Touring Car, 2-cyl., good condition	200.00
22 Haynes, 60-h.p., absolutely fully equipped	1,000.00
23 Jewel Runabout, like new.....	325.00
24 Jackson Touring Car, 2-cyl.....	500.00
25 Knox Touring Car.....	400.00
26 Knox Runabout, good for country use	225.00
27 National Touring Car, 4-cyl., very speedy	400.00
28 Olds Runabout, latest model.....	150.00
29 Olds Runabout, fine shape.....	175.00
30 Pope-Tribune, best single-cyl. made	200.00
31 Peerless Runabout, 4-cyl., fine condition	550.00
32 Ford Touring Car, 6-cyl.....	850.00
33 Queen Roadster, top, fully equipped	400.00
34 Rochet-Schneider, 1 m ported French car	750.00
35 Rambler Touring Car, 2-cyl., top	350.00
36 Rambler 4-cyl. Touring Car.....	600.00
37 Stevens-Duryea Runabout, good shape	275.00
38 Thomas Flyer, equipped, 7-passenger	650.00
39 Thomas Flyer, fully equipped, 7-passenger	750.00
40 Thomas Flyer, 5-passenger, top, glass front	650.00
41 Winton, Model E, top, in good shape	650.00
42 Autocar Runabout, wheel steer; Many others too numerous to mention. We demonstrate all cars.	375.00

When writing, state number of car in which you are interested. One block north of 12th-St. Station.

APPERSON TOURING CAR, COST \$3,750. In perfect condition, with top, glass front, extra tires, etc., \$1,750 in money, not farms or mining stock. E. Hambley, southeast corner 8th and Main Sts., Cincinnati, Ohio. c

Rates for advertisements under this heading, 20 cents per line per insertion. Each line contains about seven words. Please send remittance with order.

AT A GREAT SACRIFICE—ONE 1908 6-cylinder 60-h.p. Pierce Great Arrow Touring Car, in very fine condition, with all equipments, including cape top, semi-enclosed top, glass front, speedometer, seat covers, etc. Car used 6,000 miles. Everything guaranteed perfect. Address Box 49, Titusville, Pa.

AUTO BARGAINS—BEFORE YOU BUY talk to us. We have them from one to five hundred dollars and can save you money. Ewing-Kean Machine Co., 723 W. Fort St., Detroit, Mich. Phone, West 1253-R.

AUTOMOBILE BARGAINS—USED MACHINES, all kinds, \$150 and up. Send for our complete list. Johnson Auto Co., 4390 Olive St., St. Louis, Mo.

BARGAINS — OUR PRICES ON USED cars — condition guaranteed — lowest in country. Free list. Skaneateles Automobile Agency, Skaneateles, N. Y.

BARGAINS — 1908 BUICK 4-CYL. RUNABOUT, rumble seat. 1907 Buick 2-cyl. touring car. 1907 Buick 4-cyl. touring car. All cars in perfect mechanical condition. Call or write. Zimmerman's Garage, Valparaiso, Ind.

BARGAIN—\$8,000 FRENCH CAR, 7-PASS. \$2,500; '06 Pope-Toledo, full aluminum body, cost \$5,400, our price, \$900; Lambert '08, 4-cylinder, touring car, \$600, new paint, etc.; model N Ford, new bearing, etc., \$400; auto car runabout, \$350; Ranier touring car, \$1,350. All in good condition. Have something to tell the small garage man. Write me your wants. Chas. R. Rowison, 1600 Michigan Ave., Chicago.

BEST OFFER TAKES 1 OR 2 MODEL H-C 1908 \$1,450 Maxwell touring cars. Brand new, full equipment as per catalog. A. F. Chase & Co., Minneapolis, Minn.

BUICK TOURING CAR, '07; TOP, WIND shield, gas tank, perfect tires. Needs paint. \$500. Motor Requisites Co., Motor Mart, Boston, Mass.

BUY YOUR AUTOMOBILES FROM THE house with an established reputation. Every car guaranteed. Rambler 4-cyl., 24-h.p. gentleman's roadster, very fast and attractive..... \$ 750 Orient 1908 roadster, 4-cyl., 20-h.p., light and powerful and used as demonstrator only..... 500 Orient 1908 roadster, 4-cyl., 20-h.p., light and powerful and used as demonstrator only..... 500 Duryea roadster, 20-h.p., good condition..... 500 Waltham new 1908, fully equipped; cost \$2,000..... 1,000 Rambler 1908, model No. 34, like new..... 950 Rambler 4-cyl., 40-h.p., 1908 model..... 800 Thomas 50-h.p. 1907, top, like new..... 850 Oldsmobile 2-cyl., 20-h.p., 5-passenger..... 350 Stoddard Dayton touring, 5-passenger, top, etc..... 550 Cadillac model F, 10-h.p., top, etc., like new..... 325 High wheel autos, all makes, from \$150 up. Royal tourist 1906, 7-passenger, top, etc..... 950 Reo touring car, 1907 car, top, etc..... 500

Send for our bargain sheets. Here you get a complete description of over 250 cars, all guaranteed to be just as represented. Don't forget our new cars. Remember you buy our new cars at 50c on the dollar. Times Square Automobile Company, 1332-1334 Michigan Ave., Chicago, Ill. N. Y. address 1599-1601 Broadway.

CLEARANCE SALE OF HIGH-GRADE cars, slightly used but in perfect mechanical condition, to make room for new models. Call or write. Chas. Sweeney, 1911 Euclid Ave., Cleveland, O.

"DX" STANLEY LIGHT TOURING CAR, "Ex" Stanley runabout, both with new boilers and fully equipped with tops and lamps, cheap. Harrisburg Auto. Co., Third and Hamilton Sts., Harrisburg, Pa.

FIRST CLASS BARGAINS IN SECOND- hand automobiles. Write for description and prices. American Auto Co., Inc., 201 Fourth Ave. E., Cedar Rapids, Iowa.

FORCED SALE — 6-CYLINDER FORD; fully equipped, A1 condition. Cost \$3,300. Sell at \$775. Just overhauled. Lock Box 611, Meyersdale, Pa.

FOR SALE AT SACRIFICE—5 1908 REO Touring Cars; 2 Ford Runabouts; 1 Rambler Touring Car. All of them about as good as new, at about half price or to suit you. Write for full description. Auto Livery Co., New Castle, Pa.

FOR SALE—BRAND NEW MODEL S FORD roadster. Overstocked. If interested address 319 12th Ave., S. E., Minneapolis, Minn.

FOR SALE—COLUMBIA OR RIKER ELECTRIC 4-passenger brougham. Cost \$4,500. Excellent condition, except battery. Unexcused for livery use. Price, \$1,000. Will put in new Exide battery for \$500 additional. Might consider a trade on land. The Wittmann Co., Lincoln, Neb.

FOR SALE—HIGH GRADE ROADSTER, 6-cylinder, 75-h.p., 1908 model. Standard make, A1 condition. Cost \$4,000. Will sacrifice quick for \$2,400. Dickey, 4310 Indiana Ave., Chicago.

FOR SALE—MODEL S FORD ROADSTER, top glass, lamps and magneto; \$600. Pope-Toledo, 2-cyl., \$400. 1907 Cadillac touring car, single cylinder, \$550. Rambler 2-cyl. cheap. Denis White, Newark, Ohio.

FOR SALE—ONE TYPE X, 1 AUTOCAR, 4 cylinder detachable Tonneau and a Runabout. Box to go on rear in place of tonneau, \$650. One Type VIII Autocar, detachable tonneau, \$350. One Type X Autocar Runabout, \$250. One Model F Buick, 1907, new, never used. C. C. Stoltz, Marion, Ohio.

FOR SALE—ONE 4-CYLINDER 1907 CADILLAC touring car; top, 5 lamps, windshield, folding, Prest-O-Lite, new tires all around..... \$1,500. One 2-cylinder 30-h.p. Logan bus, 1907 model, 20-passenger capacity, seats crosswise, top, lamps, horn, curtain all around..... 1,750. One 4-cylinder Pope-Toledo touring car, front entrance..... 600. One Holman, 1907, model D, top, side curtains, lamps, generator, horn..... 400. All cars will be demonstrated. Will trade for land in this vicinity. Mobile Auto Co., Mobile, Ala.

FOR SALE—ONE 4-CYLINDER 1907 TOURING car; new tires and top; full equipment. Cash. Inquire P. O. Box 224, Ft. Wayne, Ind.

FOR SALE—ONE 1908 MODEL S FORD Roadster; one 1908 model S Ford Runabout; one 1907 model N Ford Runabout; all fully equipped and guaranteed in first class running order. Prices right. Write us at once. The Ohio Automobile Co., Dayton, Ohio.

FOR SALE—ONE 1907 POPE-HARTFORD roadster. One 1906 type 12 Pope-Toledo touring car. One 1907 model R 4-cylinder Stevens-Duryea. One 1907 model U 6-cylinder Stevens-Duryea. One 1908 model S Ford roadster. One model E single-cylinder Rambler. All these cars in good condition and will be sold cheap. For further particulars write the Arthur Gardiner Garage, Kenosha, Wis.

FOR SALE—RAMBLER TOURING CAR, 5- passenger, 24-h. p.; full equipment; 7 good tires. All overhauled and painted. Box 289, Wolcottville, Ind.

FOR SALE—MODEL NO. 5, 18-H.P., TWO-cylinder, 5-passenger Lambert auto, in fine condition; tires almost as good as new; fully equipped, without top. I must sell on account of change in my business. Price, \$450. R. W. Pharis, Box 331, Mt. Vernon, Ohio.

FOR SALE — THE FOLLOWING DESCRIBED second hand cars at very reasonable prices:

Two 35-h.p. 5-passenger touring cars.
One 30-h.p. 5-passenger touring car.
One 20-h.p. 2-passenger runabout.
Each car is equipped with top, glass wind shield, gas and oil lamps and Prest-O-Lite tank. These cars are a high grade make and in good condition. Detailed particulars will be given promptly upon request. Address Box A-304, care Motor Age.

FOR SALE—WHITE STEAMER; NEW SET tires. Just out paint shop; new engine just installed; car absolutely first class; in use 18 months. Will accept \$950.

Franklin 4-cylinder runabout. Just out paint shop; in good condition; used 18 months. Will accept \$390. Jerome P. Parker & Co., Memphis, Tenn.

FOR SALE—2-CYLINDER RUNABOUT; new top, motor, etc., and good running condition; \$125. Have bought 4-cylinder. Lock Box 7, Cayuga, Ind.

FOR SALE—2-CYL., 24-H.P., MODEL G, Olds touring car, in A1 condition, cheap. Address Proprietor New Schlitz Hotel, Ottawa, Ill.

FOR SALE—4-CYLINDER POPE TOLEDO touring car, 1905 model; in good condition throughout; have no use for it, and will take \$850 cash. For full particulars write Howard Rosso, Mt. Clemens, Mich.

FOR SALE—4-CYLINDER, 35-H.P. RAMBLER 5-passenger touring car. This is thoroughly rebuilt and will be guaranteed to the purchaser same as a new car. All new 32x4-in. tires. Repainted maroon; complete with folding top, lamps, tools, etc. \$750. Address Box A-275, care Motor Age.

FOR SALE—7-PASSENGER 45-H.P. AUTOMOBILE. Practically new. Mechanically perfect. Fully equipped. Cost \$3,500. Price \$1,500. Lloyd Cowgill, Carthage, Mo.

FOR SALE—1908 BUICK 4-CYL. RUNABOUT. \$675; with new tires, \$750. Bartlett & Frazier, Huntington, Ind.

FOR SALE—1908 TWO-CYLINDER BUICK touring car, equipped complete with top, folding glass front, speedometer, extra castings and tubes, tire chains and lamps. In first class condition. Cost \$1,400. Sell for \$825. J. L. Murray, 205 S. East St., Bloomington, Ill.

FOR SALE—1908 40-H. P. BUICK TOURING car, in absolutely first class condition in every respect. Painted maroon with red upholstering. Complete with top, speedometer, clock, chains, full lamp equipment, two extra shoes, inner tube and equipped with magneto. Cost owner \$2,800 and been run less than 2,500 miles. Address, Buick Bargain, care Motor Age.

FOR TAXICAB—30 CLEMENT-BAYARD limousine, perfect order; also 45 Mercedes Touring, 20-30 Renault Touring and 20-30 Renault limousine. Apply Renault Freres, 1776 Broadway, N. Y.

FOUR CYLINDER CHADWICK TOURING car; fully equipped; run less than 2,000 miles. Cost \$5,750. Will sell for \$2,000. Troy Carriage Works, Troy, N. Y.

HAVING PURCHASED NEXT YEAR'S model, will let go my 35-horse power Peerless, semi-limousine body, for \$1,250; completely equipped and put in A1 shape; no agents need answer. Address Box A-321, care Motor Age.

HAVING TAKEN OVER THE GARFORD Motor Car Company, Cleveland, O., stock, we have exceptional bargains in Garford cars. Write for further particulars today. Studebaker Automobile Co., Ohio Branch, Cleveland, O.

HERE ARE SOME ELECTRIC SNAPS: One Buffalo stanhope, \$700; one Studebaker runabout, \$400; one National stanhope, \$375; one Columbia runabout, \$300. These cars are all in A1 condition. Electric Vehicle Co., 621 Grand Ave., Milwaukee, Wis.

IMPORTANT.

1909

Announcement

The

International

Automobile

Company

1243-1245 Wabash Ave.

Are Now Open

With the Most Complete Automobile Organization in the World.

Six-story Building

60,000 Sq. Ft. of Floor Space.

A Separate Department for Everything in the Automobile Industry.

Hundreds of cars

New and Used.

All Types—All Sizes.

Runabouts

Roadsters

Touring Cars

Limousines

Coupes

Taxicabs

\$75 and up.

Complete Repair Shops.

We rebuild and repair all kinds of cars and employ only the best mechanics. We make bodies, tops, etc., and do all kinds of machine work.

Storage Facilities.

In connection we have the finest string of warehouses in the country, where we will store your cars at the regulation rates.

Money Loaned

on

Automobiles.

We have a special department set aside and will advance money on cars at 6 percent per annum.

The buying public are invited to come in, examine our stock and get our terms. Demonstrations cheerfully given. If unable to call, write for descriptive list.

The
International Automobile
Company,

1243-1245 Wabash Ave., Chicago, Ill.

LARGE LINE OF SLIGHTLY USED ELECTRICALS at all prices. Call or write us. The Buckeye Garage Co., 6112 Euclid Ave., Cleveland, O.

McDUFFEE AUTOMOBILE COMPANY, 1501-3-5 Michigan Ave., Chicago.

Best bargains ever offered:

1907 Stoddard-Dayton	.....	\$1,350
1906 Stoddard-Dayton	.....	1,000
1906 Pope-Hartford	.....	900
1908 Stoddard roadster	.....	2,000
1907 Rambler	.....	650
1905 Autocar	.....	600
1907 Stoddard-Dayton touring car	.....	1,400
1905 Stoddard-Dayton touring car	.....	1,000
1906 Pope-Hartford, good condition	.....	1,000
1908 Stoddard-Dayton roadster; top, double rear seat, magneto	.....	2,000

All above guaranteed and fully equipped with top and lamp. Write for full description. McDuffee Automobile Co., 1501-3-5 Michigan Ave.

MODEL F WAYNE 50-H.P. TOURING car; cape top; demonstrating car. Run less than 500 miles. Cost \$3,650. Will sell for \$1,500. Troy Carriage Works, Troy, N. Y.

MODEL N WAYNE 35-H.P. TOURING car, with cape top and speedometer; demonstrating car. Cost \$2,650. Will sell for \$1,000. Troy Carriage Works, Troy, N. Y.

MUST DISPOSE OF MY STODDARD DAYTON roadster for cash at once; was purchased in May, 1908, and run only 2,000 miles; looks just like new, has 4 cylinders, 40-h. p. motor; in perfect condition; first offer for \$1,400 gets it; dealers need not answer. Address Box A, 320 care Motor Age.

ONE MODEL M WINTON, FULLY EQUIPPED with lamps, top, etc., at less than half original cost. Not an old, worn-out car, but in perfect condition. Owner purchasing 6-cylinder, same make. Address Box A-316, Motor Age.

ONE 1906 WHITE STEAM TOURING CAR, equipped with top, etc.; price, \$1,000. One 1906 model G Franklin touring car, equipped with top, A1 condition; price, \$850. One 1908 model 10 runabout, used a few times for demonstrating, A1 shape; price, \$850. One 1906 Thomas with tourabout body, first-class condition; price, \$1,500. One 1904 Cadillac touring car, good condition; price, \$350. One 1907 Oldsmobile runabout, A1 condition; price, \$1,800. One 1906 model R Stevens-Duryea, overhauled and repainted; price, \$1,200. One 1907 White Steamer runabout, good condition; price, \$1,300. Halsey Automobile Co., 3910-12-14-16-18 Olive St., St. Louis, Mo.

ONE 1908 EARL ROADSTER, RUN LESS than three months, in excellent condition. Will sell cheap. Wm. H. Wendt, 188 8th St., Milwaukee, Wis.

OUR TYPE E "A B C" MOTOR WAGON, surrey type, brand new. Completely equipped with top, side curtains, lamps, horn and tools. Will sell for \$500 cash to quick buyer. A. F. Solliday, 188 8th St., Milwaukee, Wis.

OUR 1908 BIG 6 STEVENS-DURYEA demonstrator, run less than 500 miles, guaranteed as good as new; full equipment; new price, \$6,000; our price, \$4,500. E. Chisholm Phillips Auto Co., 5906 Euclid Ave., Cleveland, O.

PACKARD LATE 1907; FINEST CONDITION; completely equipped; twenty-seven fifty (\$2,750) cash. J. W. Hammond, P. O. Box 976, Buffalo, N. Y.

RAMBLER ROADSTER FOR SALE, 1908 model; perfect condition; new tires; now being painted; make best proposition subject to examination. Box A-317, Motor Age.

(Continued on page n8.)

(Continued from page 77.)

RAMBLER, 2-CYLINDER, 5-PASSENGER, 1906 model; equipment, full set of lamps, generator and top; in fine condition throughout; tires, Goodrich. Will accept first reasonable offer. Address Box 656, Waterbury, Conn.

SECOND-HAND AND SLIGHTLY USED autos very cheap. Auto T. & R. Co., 2167 East 9th St., Cleveland, O.

SECOND-HAND CARS—NOT THE USUAL kind as sold by many agents and users, but cars thoroughly overhauled and guaranteed to be right by a responsible house. Send for illustrated catalogue. Nyberg Automobile Works, 2449 Michigan Ave., Chicago, Ill.

SACRIFICE—1907 THOMAS FLYERS; 1906 Acme; new 1907 Reo touring car; second-hand model "R" Ford, 1907. E. S. Youse, Reading, Pa.

SECOND-HAND BARGAINS.
1 White Steamer, 1908; fully equipped.
1 1909 Mitchell, detachable tonneau; full equipment.
1 Mitchell touring car; fully equipped.
1 Rambler touring car, 2-cylinder.
1 Winton touring car; full equipment.
1 Reo touring car; full equipment.
1 Pope-Toledo.
1 Loco, 40-roadster; full equipment.
No reasonable offer refused for these cars. Wisconsin Automobile Exchange, 243 Wisconsin St., Milwaukee, Wis.

STANLEY STEAMER, LIMOUSINE SHOW cars, at special price. Also 3 runabouts, from \$175 upwards. New 1909 runabouts on exhibition. D. Walter Harper, Philadelphia agent Stanley Steamer, Broad and Clearfield Sts., Philadelphia, Pa.

WE HAVE FOR SALE THE FOLLOWING second hand cars at bargain prices: 1907 model D touring car; 1906 model D touring car; 1907 model G runabout. Franklin Automobile Company, 73d St., Amsterdam Ave. and Broadway, New York.

WHITE STEAM TOURING CAR, 1908 MOD- el K, used only five months and in superb condition throughout, nicely equipped, and will be sold at a bargain if taken at once. Address White Steamer, 1200 Niagara St., Buffalo, N. Y.

WHO WANTS MY DURYEA 3-CYLINDER 20-h.p. Runabout? Leather top, horn, lamps, searchlight, generator, tools, etc. Very powerful, any hill on high gear. Demonstration given. Sell cheap. Write for price or make offer. C. L. Jones, Has-kell, N. J.

WINTON SIXTEEN-SIX, 1908 MODEL; nicely equipped and in absolutely fine condition. Will accept \$2,400 if taken at once. E. R. Thomas Motor Co., second-hand dept., 1200 Niagara St., Buffalo, N. Y.

WHY WAIT? ACT NOW. MUST MOVE all used cars by January 1. Large stock to select from; no reasonable offer refused. Auto Clearing House, 240 Michigan Ave., Chicago.

WRITE US FOR PRICES ON SECOND hand White cars. We can fit you out with any model. Webb Jay Motor Co., 2335 State St., Chicago.

35-40 LIMOUSINE POPE-TOLEDO, 1908; overhauled and repainted; in perfect order. Price \$2,750. Fully equipped. Troy Carriage Works, Troy, N. Y.

WE HAVE NEW YORK'S REAL AUTO-

mobile show—with the largest garage in New York and a floor space of over 60,000 feet, crowded with new and second-hand cars, the majority on consignment, we offer more inducements to the man seeking a good automobile at a low price than any automobile show can present. We have over 250 cars for quick sale, at prices from \$150 to \$4,000. The following will give you some idea of what we can offer:

Panhard touring car, fully equipped...	\$1,000
Rochet Schneider, like new; fully equipped	1,450
De Dietrich touring car; fully equipped	1,000
Packard touring car, like new.....	1,850
Matheson touring car, like new; fully equipped	1,450
Oldsmobile touring car, like new; fully equipped	725
Oldsmobile tourabout, rumble seat.....	900
Thomas tourabout	600
American Mors tourabout, 1908.....	950
Knox Air-cooled runabout.....	350
Franklin Air-cooled runabout.....	350

We are different from any other house in New York and can offer distinctive values. Our business necessitates quick sales and to secure the latter, low prices must be offered. We sell cars on 5 per cent commission basis, acting as the brokers for the owners. Those who purchase here escape paying a profit to the dealers. This system gives us the choice of all desirable cars. Our patrons practically come in contact with the owner and get the car at the figure he is willing to accept. It would take pages to describe the many cars here, and as there are new arrivals daily, the best plan is to come and inspect; 'phone or write for bargain list. We are two blocks from Broadway. This means many hundreds saved in expenses and is one reason why our prices are so much lower than others ask. Ours is a practical system which appeals to the intelligent and explains why we are America's real largest dealers. Manhattan Storage Company, 334-340 West 44th St., New York City—two blocks from 42d St. Station 9th Ave. "L."

1 50-H.P. MODEL T HAYNES, 5-PASSENGER, 34x4½ Diamond tires, in excellent condition. Full cape top. Speedometer. Gabriel 3-tone horn. Fully guaranteed. \$1,825. New this season.

1 35-h.p. Stoddard-Dayton, 5-passenger, 34" x 3½" tires in splendid condition. Glass front, full cap top. Speedometer. Extra tires. For quick sale, \$900.

1 22-h.p. 1908 Roadster. Double rumble. 4-cylinder, shaft drive. 32x3½ tires, in fine condition. New July 20. Best of care. Just overhauled. List, \$1,500. Price, \$1,000. Cars have had best of care by owners. O. S. C. O.

\$175 FOR OLDSMOBILE RUNABOUT; NEW last year. Also 5-passenger touring car, in perfect mechanical condition. No reasonable offer refused. J. L. Hess, 952 Garfield Blvd., Chicago.

15 AUTOS—MUST BE SOLD. MICHIGAN runabout, \$90; steam surrey, \$100; Woods electric, \$125; Cadillac, \$325; a 4-cylinder \$2,800 car, \$750. Others in proportion. Stamp gets bargain sheet. T. S. Culp, Canton, O.

1907 24-H.P. JACKSON RUNABOUT, shaft drive, top and glass front, nearly new, \$700.

1907 35-h.p. Grout, 5-passenger, with top, Rutenber motor, \$800. Mitchell touring car, \$900. Locomobile, two bodies, \$2,000. Thomas B. Jeffery & Co., 1462-64 Michigan Ave., Chicago.

1907 STEVENS-DURYEA, MODEL R, IN excellent condition; recently overhauled; complete equipment, top, gas tank, Warner speedometer, extra tires, storage battery; brand new tires on front and 4-inch Fiske, in fine condition, on rear. Price, \$1,250. Standard Auto Co., Detroit, Mich.

For Sale or Exchange

EXCHANGE OR FOR SALE—2-CYLINDER Buick touring car, 1905 model, in first-class running order; top, etc., complete. Will exchange for runabout. What have you to offer? L. Leonard & Co., 395 Market St., Newark, N. J.

EXCHANGE—200 SHARES OF THE RICE Electric Switch Co.'s stock (one of the greatest electrical inventions) for 1908 Buick or Reo touring car, fully equipped and in A No. 1 condition. Box 155, Walker, Ia.

FOR SALE OR EXCHANGE—TWO NEW Rapid Sight Seeing cars; less than 3 months old; 20-passenger; 30-h.p., 2-cylinder engines; will exchange for touring cars; want 4-cylinder engine and seating 5. Auto Transfer Co., Hattiesburg, Miss.

FOR SALE OR EXCHANGE—1908 K 45-H. P. Stoddard-Dayton roadster, wide rear seat, extension top, Bosch magneto, run less than 300 miles; cost \$2,975 three months ago. Absolutely good as new. Will trade for '08 car of cheaper make for cash difference. P. F. Ortman, Washington Court House, O.

FOR SALE OR TRADE FOR, WHAT HAVE you? an autocar; 5-passenger car, 2 cyl., 12-h.p., sliding gear, shaft drive. J. P. Hansen, St. Ansgar, Ia.

FOR SALE OR TRADE—FOR MODREN 4- cyl. car, 4,000 shares of Kalamazoo Gold Mining Co.'s stock; par value \$1 per share; also one 12-h. p. Auto-Buggy. F. W. Fisher, Sedal, Mo.

FOR SALE—WHITE STEAMER, 7-PASSENGER. Fully equipped; in fine condition, good as new. Price \$1,500, or will trade for a small car. Jacob Roth, 1117 State St., Erie, Pa.

SOUTHERN PLANTATION—TO TRADE for high grade car in first class running order, with complete equipment. Geo. H. Alling, Akron, Ohio.

TWENTY PER CENT ON YOUR INVESTMENT! We are offering South Dakota lands in exchange for automobiles. These lands will bear the closest inspection and we guarantee them to pay you 20 per cent on your investment. Otis Land Co., Blunt, S. D.

WANTED—ON ACCOUNT OF SICKNESS, will sacrifice property to raise cash and will take \$2,000 and 4-cylinder touring car worth \$1,000 for \$4,000 equity in two-flat brick building on East 36th St. Box A-326, care of Motor Age.

25 AND 30 H. P. ST. MARYS GAS ENGINE to exchange for good touring car or run-about. Address C. A. Uish, Risingsun, Ohio.

Rebuilding and Repairing

ALL KINDS OF AUTOMOBILE LAMPS repaired and replaced. Old lamps made like new. It will pay you to have your lamps, horns and generators repaired. Give us a trial. The Illinois Carriage Lamp Co., 81 Illinois St., Chicago.

ALL KINDS OF AUTO LAMPS, HORNS, pumps and generators bought, sold and repaired. Auto Lamp Works, 1341 Michigan Av., Chicago.

AUTO PARTS MADE, ENGINES RE-paired, rebuilt, all kinds of expert overhauling and machine work. Guaranteed workmanship. Moderate rates. Murray Machine Wks., cor. Winchester & Wabansia, Chicago.

AUTOS REBUILT AND OVERHAULED; cars and batteries made to order; special machine work; cars bought and sold. Olson, 1716 Wellington St., Chicago. Phone 465 L. V.

AUTOS REBUILT AND REPAIRED; GEN-eral machine work. All work guaranteed. Dead storage at moderate rates. Adams & Russell, 316 E. 31st St., Chicago.

AUTOS REPAIRED AND OVERHAULED. Foreign machines a specialty. Parts duplicated and special machine work. Andre G. Catelein, 1446-8 Indiana Ave., Chicago, Ill. Phone, 1187 Calumet.

AUTO TIRES AND TUBES REPAIRED and rebuilt by the Edgewater Vulcanizing Co., 1116 Sheridan Rd., Chicago. Equipped to do the best work and do it promptly.

COIL REPAIRING. Ship us your coils. We repair them at the least expense and guarantee our work for 2 years. Our unexcelled facilities enable us to do this. "We do things here." Marinette Electrical Repair Co., Marinette, Wis.

IMPROVE THE WINTER MONTHS BY having your car overhauled and painted. All work guaranteed. O. K. Wright Official Garage and Repair Shop, 33d and South Park Blvd., Chicago.

RADIATORS AND LAMPS REPAIRED BY experts. Ship to us and follow with letter. Auto Rebuilding Co., 1349 Mich. Av., Chicago.

THIS IS THE TIME OF YEAR TO SEND in your old tires and have them put in Al shape for spring service. We are not the largest but the best tire repair company in the country. We also supply and sell all makes of solid vehicle tires, also all makes of new auto casings and tubes. We have on hand a full line of second-hand tires and tubes at one-third the list price of new tires and tubes. This is not hot air. Give us a trial and be convinced. Chicago Tire Repair Co., Michigan Blvd., at 35th St., Chicago.

USED MODELS—GENERAL OVERHAUL-ing. Lindskog, 3522 Vincennes. Doug. 1979.

WE KNOW HOW! BRING US YOUR MA-chine and we will put in condition for the winter's rough riding. Dooley-Meyer Automobile Co., 541 Wabash Ave., Chicago.

WE REPAIR, OVERHAUL ALL MAKES OF autos, build experimental cars or parts to order. Work guaranteed. Estimates furnished. United Auto Works, 30th & Mich.

Help Wanted

PARTNER WANTED FOR AUTO BUSI-ness. Must be good general repair man and have \$1,000 to \$2,000. Location Boston Post Road. Fireproof garage ready. Write H. C., care Motor Age.

WANTED—AGENTS TO SELL SECOND hand autos for the Chicago Automobile Commission Company, 542-44 Wabash Ave. Write for list and proposition. Mention Motor Age.

WANTED—A SUPERINTENDENT FOR chassis assembling department by new concern. None but a hustler with an aptitude for hard work can fill the place. Must also have had experience with high grade construction. Name salary to start and give full particulars. R. L., care Motor Age. 1

WANTED—COMMISSION SALESMEN who can call on gasoline engine builders and dealers in automobile supplies. Good side line. Box A-328, care Motor Age. 1

WANTED—THOROUGHLY COMPETENT foreman for trimming shop for automobile factory. No attention paid unless experience, references and salary to start are stated. Address X. Y. Z., care Motor Age. 1

Situations Wanted

AS SALES MANAGER, FACTORY REPRE-sentative or salesman for New England territory preferred, with Boston headquarters, handling automobiles or accessories. Will make change shortly. 14 years' successful experience with Al record. Salary and commission basis. H. S. C., care Motor Age. 1

CHAUFFEUR, THOROUGH AUTOMOBILE machinist and electrician, all repairs and overhauling, any make of gasoline car or electric, wants position, any part U. S. or foreign. F. D. Kelle, 243 E. Seventy-eighth St., New York city.

Books for Motorists

AUTOMOBILE CATECHISM—BY FORREST R. Jones, M. E. This is a thoroughly practical, modern work, published in pocketbook form. Size, 4 $\frac{1}{2}$ by 7. Pages, 134. With drawings. Genuine Morocco cover, \$2. The Class Journal Co., 1200 Michigan Ave., Chicago.

"AUTOMOBILE OWNERS, KNOW YOUR Car." To get best results study the standard handbook on care and management, entitled "Homan's Self-Propelled Vehicles," sent postpaid for \$2. Money returned if not pleased. Order today. Audel & Co., Publishers, 63 Fifth Ave., New York.

BLUE BOOK NO. 3—COVERING NEW Jersey, Pennsylvania, Delaware, Maryland and trunk lines to the Middle West. Bound in genuine leather. Price \$2.50 prepaid. The Class Journal Co., 1200 Michigan Ave., Chicago.

NOW READY FOR DELIVERY, SECTION No. 4, the Official A. A. A. Automobile Blue Book, indispensable to automobile touring the Middle West. Bound in genuine leather. Price, \$2.50 prepaid; 370 pages. The Class Journal Co., 1200 Michigan Ave., Chicago.

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Parts and Accessories

(FOR SALE)

A SPECIAL LOT SUPPLEMENTARY springs, wind shields, storage batteries, tire treads, repair kits, boots and patches. Factory prices. Auto Economy Co., 1426 Michigan Ave., Chicago.

A SPECIAL LOT OF 1,000 MICA SPARK plugs, guaranteed or money refunded. 75c each, postpaid. Robert Instrument Co., 66 Shelby Ave., Detroit, Mich.

AUTO TIRE MART, 1904 BROADWAY, New York City. Large stock second-hand tires and tubes, all reliable and standard makes, cheap. Our rubber anti-skid tread takes the place of a chain to perfection. Vulcanizing and repairing in every branch. Satisfaction guaranteed.

AUTO TIRES, NEW CLINCHER CASINGS, fresh stock, every one a bargain:

28x3	\$10.65	30x4	\$17.90
30x3	11.15	32x4	18.90
32x3	11.75	34x4	21.00
28x3 $\frac{1}{2}$	13.00	36x4	22.00
30x3 $\frac{1}{2}$	13.50	34x4 $\frac{1}{2}$	21.50
32x3 $\frac{1}{2}$	15.80	36x4 $\frac{1}{2}$	23.50
34x3 $\frac{1}{2}$	16.50	36x5	26.00
36x3 $\frac{1}{2}$	16.50		

W. M. Sharpe, 118 West Broadway, New York City.

AUTO TIRES—28x3, \$10.00; 30x3, \$11.00; 30x3 $\frac{1}{2}$, \$13.00. These are brand new, clean goods. Overstocked. Must sell. Write today for new 1909 prices on any size. Will surprise you. A. H. Kasner, 152 Church St., New York City.

AUXILIARY SPIRAL SPRING BUMPER for weak leaf springs; absolutely prevents breakages. Carry a pair to go home on when your leaf spring breaks. \$5, express prepaid. Supplementary Spiral Spring Co., 31 Columbus Ave., Boston, Mass.

BARGAIN IN NEW INNER TUBES; ALL guaranteed to hold air. Purchased at special sale.

28x2 $\frac{1}{2}$, 28x3 $\frac{1}{2}$, 30x4	\$2.50
28x3, 30x3, 30x3 $\frac{1}{2}$	3.00
32x3 $\frac{1}{2}$, 32x4, 34x3 $\frac{1}{2}$	3.50
34x4, 34x4 $\frac{1}{2}$, 34x5	4.00
36x3 $\frac{1}{2}$, 36x4, 36x4 $\frac{1}{2}$, 5	4.50

Write for prices on other supplies. We also repair any make of tire. All work guaranteed. Chicago Vulcanizing Co., 1400 Michigan Ave., Chicago, Ill.

BARGAINS—1 ORIENT 4-H.P. MOTOR complete, \$35; 2 Pittsfield Non-Vibrator Coils, new, \$3 each; 1 Set Frame, Wheels, Axles, etc., for Auto Buggy, new, \$30; 9-ft. Diamond Roller Chain, $\frac{1}{2}$ x 19-16, new, at 50c ft.; 1 64-tooth Sprocket, \$5; 1 36-tooth Sprocket, \$2, both new and for above chain. N. O. Penny, Vero, Fla.

BOOTH'S FELT PACKINGS FOR REPAIR-ing automobiles are designed to retain the oil, exclude the dust and tighten loose joints, and are absolutely necessary in connection with ball, roller and plain bearings, hubs, and transmission cases, and are made in strips and endless rings of any size and thickness to fit any car. Dust rings for the hubs, strips for transmission cases, washers for all lubricating and dust excluding purposes. I have dies to fit any bearing of any make of car, and can fill any order within twenty-four hours. You will get exactly what you want, and the price will be right. There are so many sizes, no dealer carries a full stock. Write for prices and give dimensions. N. E. Booth, 741, 39th St., Brooklyn, N. Y.

BRAKES—EXTERNAL DOUBLE-ACTING band brakes: 939, 9 $\frac{1}{4}$ " x 1 $\frac{1}{4}$ "; 72, 9 $\frac{1}{2}$ " x 2 $\frac{1}{4}$ "; 57, 6" x 2". No better made. Will sacrifice to quick buyer. Address Blackwell Brake Co., Box 1031, Bridgeport, Conn.

BRAND NEW—\$7.50 BUYS A 6-VOLT 60-ampere storage battery. Fresh goods. Will run machine 1,000 to 2,000 miles on single charge. S. Breakstone, 900 Fisher, Chicago.

BRAND NEW COUPE MADE FOR MODEL S or R Ford; finest limousine construction throughout; cost \$350. \$150 takes this snap. Write Box A-281, care Motor Age.

BUFFUM CAR USERS WILL FIND THAT We carry repairs for engines from 1902 to 1907. Send for price list of castings for engines from two to eight cylinders and from 4x4 to 6x6 inches. Lowell-American Automobile Co., 107 Cushing St., Lowell, Mass.

FOR SALE—AN AUTOMOBILE TOP, SET of fenders and patterns for a 6"x6" opposed gasoline engine. Write H. S. Bell, 1415 So. E St., Elwood, Ind.

(Continued on page n10.)

(Continued from page 110.)

FORD RUNABOUT OWNERS, NOW IS the time to order our outfit to change your N. S. or R. into new "S" roadster, new fenders and rumble seats, dash hoods, folding hoods, glass fronts, tops, oilers, magnetos. Write for catalogue A today. Auto Rebuilding Co., 1349 Michigan Ave., Chicago, Ill.

FOR SALE—CHEAP—2 FUR AUTOMOBILE lap robes; size 5x5½; Siberian bear and Russian dog. Mrs. Lefy, 1654 Briar Pl., Chicago, Ill. Phone, Lake View 4462.

FOR SALE—COMPLETE PARTS TO BUILD an auto buggy. 687 Lake St., Chicago, Ill. B.

FOR SALE—COMPLETE SET OF CASTINGS for vertical and opposed engines, air or water cooled, all sizes. Comet Motor Works, 47 S. Canal St., Chicago.

FOR SALE—GASOLINE MOTORS FROM 10 to 30 h.p., water and air cooled; also castings in the rough with blueprints. Miller Bros., 1282 Talman Ave., Chicago, Ill.

FOR SALE—LIMOUSINE BODY FOR Pierce 1906 touring car; used three months; repainted blue; excellent condition. The Citizen's Motor Car Company, Cincinnati, O.

FOR SALE—MARINE ENGINES, 4-CYCLE, 8-h.p., \$100. 16-h.p., \$200. 20-h.p., 4-cylinder, \$300. E. H. Clay & Co., Kinsman Road, Cleveland, Ohio.

FOR SALE—TUBULAR STEAM BOILER, complete, 5-0x16-0, with front and breeching, now running under pressure of 90 lbs. We are to replace same with larger boiler. We can deliver about January 15. Call and see us or write. Lockwood & Strickland Co., Halsted and 49th St., Chicago.

FOR SALE—6-CYLINDER COIL FOR AUTOMOBILE, new, cheap. F. Booth, Stanley, N. Y.

FOR SALE—14-H.P. 4-CYL. 4-CYCLE AIR cooled auto engine; 7-h.p. single cyl. marine engine; 6-cyl. auto dash coil; 10-h.p. steam auto engine; typewriter, standard make; large office safe; a 6, 7 and 10-h.p. stationary gasoline engine; large quantity hack saw blades. Low price on above. F. Booth, Stanley, N. Y.

FOR SALE—1909 GUARANTEED CASINGS and tubes; standard makes at dealer's prices; 28x3, \$12.20; 30x3, \$13.10; 30x3½, \$19.30; other sizes at corresponding prices. Single tube automobile tires; 26x2½, \$9; 28x2½, \$10; 28x3, \$12; 30x3, \$13; seconds, \$2 less each. Vulcanizing done well; prices reasonable. Repaired casings for sale. Serviceable bicycle tires, \$2.25 per pair. Chas. E. Miller, Anderson, Ind.

GOODS AT LESS THAN MANUFACTURERS' COST! Bevel gear axles, \$80 per pair; pressed steel frames, \$18; wood wheels, new, 28x2½, \$14 a set; Olds type axles, front, \$10, rear, \$25; tonneau top, upholstered in leather, \$60; four speed oilers, \$3.75; five speed mechanically operated oilers, \$8; two-cylinder Splitdorf dashboard coil, \$12.50; 28x3 tires, \$9; tubes, \$1.50; 12 tube radiators, \$6; hood radiators, \$20; Cotta transmissions, \$60; planetary transmissions, \$28; marine motors, \$28; Warner differential gears, \$8; cylinder oilers, 75 cents; 4½x5 water-cooled motors, \$70; wood wheels, 30x2 with solid tires, \$25; fenders, \$8 a set; 4½x4 air-cooled motor, \$75. Get our bargain sheet. Auto Parts Co., 52 W. Jackson Blvd., Chicago.

IF YOU FEEL YOU ARE PAYING TOO much for supplies, write for our catalogue and save money. Agents take notice and write today and let us know what cars you sell. Kansas City Automobile Supply Co., 609 M. 18th St., Kansas City, Mo.

LOOK HERE! NEW CARBURETORS, \$2.50 each. Heitger 1907 type, left over. Guaranteed in good order. We have about 75 1-inch and 1½-inch, both vertical and horizontal. Make an offer for the lot. Cash with order only. Heitger Carburetor Co., Indianapolis, Ind.

MEN'S TAN GOVERNMENT KHAKI waterproof duster coat. From factory to wearer. 54 inches long. Full military skirts. Collar adjustable two heights. Wind shields in sleeves. Rain coat and duster combined, \$8.50 value for \$4.50. Express prepaid on receipt of price; money refunded if not satisfactory. Send for swatch. Fuller & Sullivan, 11 to 19 Elliot St., Boston, Mass.

NOW IS THE TIME to buy extra automobile tires and inner tubes at the right price. A limited number of high-grade repaired tires; all sizes and types. The kind that will give you service. India Rubber Tire Co., 475 Wabash Ave., Chicago.

ONE PERFECTED KINGSTON CARBURETER, Floating Ball Type. Brand new. Have two, only need one. Bargain. Address Box 626, Jacksonville, Fla. b

OWNERS, 1903-04 WHITE STEAMERS, your car should have our improved Idler attachment. Write us. Auto T. & R. Co., 2167 East 9th St., Cleveland, O.

RADIATOR HOODS, MUD GUARDS, METAL dashes, gasoline and water tanks. If building or remodeling a car it will pay you to write us, as we lead in this line. Auto Sheet Metal Works, 2230 Michigan Ave.

RELIABLE MANUFACTURING CONCERN have a few automobile tires to close out at less than cost. No seconds and fully guaranteed. State sizes and make of tire you prefer. Box A-252, care Motor Age.

RUMBLE SEATS AND "BABY" TONNEAUS for Ford, Maxwell, Buick, Cadillac and other cars, fenders, radiators, hoods. We are the big mail-order rebuilding house. Send for catalogue. A. R. Co., 1349 Michigan Ave., Chicago, Ill.

SHINEBRIGHT METAL POLISH IS ABSOLUTELY the best on the market; sample and quotation furnished upon request. Shove & Gage Co., Inc., Providence, R. I.

SIX CYLINDERS.....\$1.50
Four Cylinders 1.00
Two Cylinders 50
Is all you got to pay for the most indispensable auto tool made. "The Trouble Finder," when put on the spark plug, you can tell if your timer is in the right place; you can tell which cylinder is not doing its work, caused by leaky valves or a faulty spark plug.

Works the same on dry cells, storage or magneto. A good investment for the owner, chauffeur and the repair man.

Sent prepaid for stamps, checks or currency. Sallander Auto Co., Fort Madison, Iowa.

SPECIAL LOT 1909 SCHEBLER CARBURETER outfits, complete for Reo, Ford, Buick, Maxwell, Cadillac and other cars. More power, easier starting, better control. \$10.75 to \$18 complete. Jenkins Specialty Mfg. Co., Sumter, S. C.

SPECIAL PRICES ON WIND SHIELDS, touring car tops and limousine bodies. Agents for Goodyear tires. Write for catalogue and prices. Holcker-Elberg Carriage & Rubber Co., 1420-1426 McGee St., Kansas City, Mo.

SPECIAL SALE AT \$10 A PIECE—30 6-volt 40-ampere-hour ignition batteries. Also several bargains in electric autos. A. W. Rumsey, 245 Jefferson Ave., Detroit, Mich.

STEAM CAR OWNERS—SEND FOR SAMPLE of engine and pump packing. R. A. Robbel, 221 E. Thirty-first St., Chicago.

THE KING IS AN AUTO TIRE THAT HAS never yet been punctured, and some of them ridden more than 10,000 miles; will outwear two rubber tires and then some. Liberal commission to good salesmen. King Leather Tire Co., 369-371 East Water St., Milwaukee, Wis.

TIRES—NEW GOODS, 1908 STOCK.
25x2½ \$ 9.00 32x3½ \$16.00
28x3 10.00 34x4½ 20.00
30x3 11.00 30x4 17.50
30x3½ 13.00 32x4 19.00
Mail orders filled promptly. We ship goods to every part of the globe. Anchor Tire Co., 88 Chamber St., New York City. k

TIRES—TIRES—WE CAN SELL ANY make, any size or style tires or tubes for less money than any dealer in the United States. Do not buy until you get our prices. Send for complete list. Excelsior Tire Co., 1777 Broadway, New York City.

U-AUTO POLISH WILL KEEP THE VARNISHED parts of your automobile or carriage in excellent shape. Address Shove & Gage Co., Inc., Providence, R. I., for sample.

UNIVERSAL FLUXINE BRAZES CAST-IRON. Guaranteed. Any one can do this work with regular brazing equipment. Send 50 cents stamps or currency for pound. Universal Fluxine Co., Urbana, Ohio.

WALKER KEROSENE BURNER, COMPLETE with Automatic Regulator. Full instructions. Guaranteed good as new. \$15. Henry L. Collman, Box 53, Massena, Iowa.

WE WANT YOUR ORDER—NEW GUARANTEED goods. Casings, 28x3, \$11.90; 30x3, \$12.80; 30x3½, \$18.80. Tubes, 28x3, \$2.95; 30x3, \$3.15. Proportionate prices on other goods. We save you 25 to 50 per cent on auto supplies. Write for prices. The Jones Auto Co., 20th and Telegraph Ave., Oakland, Cal.

WIRE AUTO WHEELS, TWO SIZES, new. Geo. Platt, Sedgewick St., Bridgeport, Conn.

4-H.P. AIR COOLED ENGINE WITH DROP forged crank, one piece cylinder and head, other valuable features. \$58. Climax Elec. Works, New Salem, Mass.

1 CRANK SHAFT AND FLY WHEEL, FOR Rambler Surrey Type 1, new; 1 2-cyl. Atwater Kent, complete, \$20; 1 Swivel Searchlight, mirror lens reflector. Ralph Edwards, Malvern, Pa.

8 TO 32-H.P. ONE TO FOUR-CYLINDER, 2-cycle auto and marine motors. \$65 per cylinder. Butts, Oxford, N. Y.

1907 LIMOUSINE BODY, BUILT BY Rothschild, in France, at a cost of \$3,800; will fit a Packard; will sell for \$300. Frank Reese Automobile School, 2011 North Carlisle St., Philadelphia, Pa.

150 SLIGHTLY USED AND PATCHED inner tubes, different sizes, \$1.50 to \$2.00. 75 Ithica mufflers, \$3.50. 150 set wood wheels, cheap. Motor Requisites Co., Motor Mart, Boston, Mass.

1907 WIND SHIELDS AT COST OF MANUFACTURING; standard size, folding, cut for your car; only a few left. Address Chicago Wind Shield Co., 235 Johnson St., Chicago.

10,000 WRAPPED TREAD INNER TUBES in stock, brand new. Price, \$3 each. Small sizes less. 6,000 clincher and quick detachable shoes. Do us a favor and write for prices today; will surprise you. A. H. Kasner, 152 Church St., New York City.

Cars Wanted

I HAVE THE SPOT CASH FOR A SLIGHTLY used car and will buy from an owner direct. What have you? Box A-243, care Motor Age.

I WILL BUY A LATE MODEL RUNABOUT or touring car from an owner if it is in good condition and a bargain. Box A-244, care Motor Age.

WANTED—FORD 4-CYL. RUNABOUT, model N, R or S; must be cheap. For sale—1 Orient Motorcycle, \$75; 1 Orient Buckboard, \$75; 1 Cadillac Touring Car, \$200. Address Lock Box 195, Palmer P. O., Marquette Co., Mich.

WANTED—SMALL SECOND-HAND touring car, late model; tonneau body preferred. Give full particulars and price. Address Box X 144, care Motor Age. Mc

WANTED—STEVENS-DURYEA, MODEL X or U, 1907 or 1908. For cash. A. R. Manley, Mt. Carmel, Ill.

WANTED—WILL PURCHASE TWENTY-FIVE first-class taxicabs. Give full description and lowest price. C. A. Coey & Co., Chicago.

WILL BUY RUNABOUT THAT IS GOOD condition and cheap. Prefer Buick—Model S, Ford—and Maxwell. Send full description with attachments that go with car. H. Borksdale, P. O. Box 630, Dallas, Tex.

Parts and Accessories

(WANTED)

WANTED—A PRESTOLITE GAS TANK. Cash for a bargain. Or will trade large Solar generator, practically new. Write H. C. Keast, 556 N. 5th St., Reading, Pa.

WANTED—LARGE TOURING CAR BODY, upholstered and finished to fit chassis 38"x96". State price, color, etc. Address Kuhn, 1812 Harney St., Omaha, Neb.

Tire Repairing

BRING US YOUR WORKOUT TIRES AND we will make them like new. Retreading, vulcanizing and general tire repairing guaranteed. Peerless Tire Repair Co., 107 E. 20th St., Chicago.

FRANKLIN VULCANIZING WORKS, 391-393 Franklin Blvd., between Grand and Chicago Aves.; phone Humboldt 1012. Auto tire vulcanizing and repairing. Large stock of new and second-hand tires and sundries in stock.

GET FACTORY WORK AND QUICKER service and save money. Our facilities the best, recovering and retreading; Morgan & Wright tires carried in stock. Bland-Mueller Auto Co., Prairie Ave., Milwaukee, Wis.

HIGH-GRADE REPAIRING OF AUTOMOBILE tires. All work guaranteed. Maryland Automobile Tire Repair Works, 1535 Maryland Ave., Baltimore, Md.

SEND US THE OLD TIRE AND LET US make it like new. We rebuild, retread and vulcanize all kinds of tires. Work all guaranteed. Prices right. Wisconsin Auto Tire Repair Co., 89 Oneida St., rear, Milwaukee, Wis.

TIRES. MODEL VULCANIZING CO. TIRES. Have your tires repaired and vulcanized by reliable experts. All work guaranteed. Let us save you money on new tires. We repair all types of clincher motor cycle casings and tubes, and also repair and apply solid vehicle tires. Our motto: Right and Reasonable. Model Vulcanizing Co., 1547 Michigan Ave., Chicago.

TWENTY-FIVE PER CENT REDUCTION in repair work. Reduce your tire expense by letting us do your work. We have the largest, best equipped repair and rebuilding tire factory in the west. All work guaranteed. We can sell and save you money on any tire or tube made. Get our prices. See us. Write us or call up Calumet 1859. We can show you. The Old Reliable Fanning Tire Company, 1610 Michigan Ave., Chicago.

WESTERN VULCANIZING WORKS (THE house with the reputation). No matter where you live, you will save money and time by sending your work to us. Original mileage guaranteed at one-third the cost. 249 Pearl St., Fort Wayne, Ind.

Batteries

COELCO DRY BATTERY RENEWER, A preparation we positively guarantee to renew dry batteries. If our preparation fails your money back and 100 per cent more for your trouble. A trial package with book on dry batteries will convince you. Sample postpaid, 25 cents. Commercial Electrical Co., Kewanee, Ill.

DRY BATTERIES RENEWED SEND 25 cents for recipe to renew them. Can be done anywhere on the road. B. D. Harris, 373 East Utica St., Buffalo, N. Y.

Tire Filling

NEWMASTIC, THE AIRLESS INFLATION for automobile tires, makes good new casings wear long.

Mr. F. C. Todd, of Baltimore Branch of the General Electric Co., writes us under date of December 14, 1908, as follows: "You filled my tires with Newmastic October of last year. I am now practically running on the inner tubes. For hacking about there is no question but that Newmastic is the thing."

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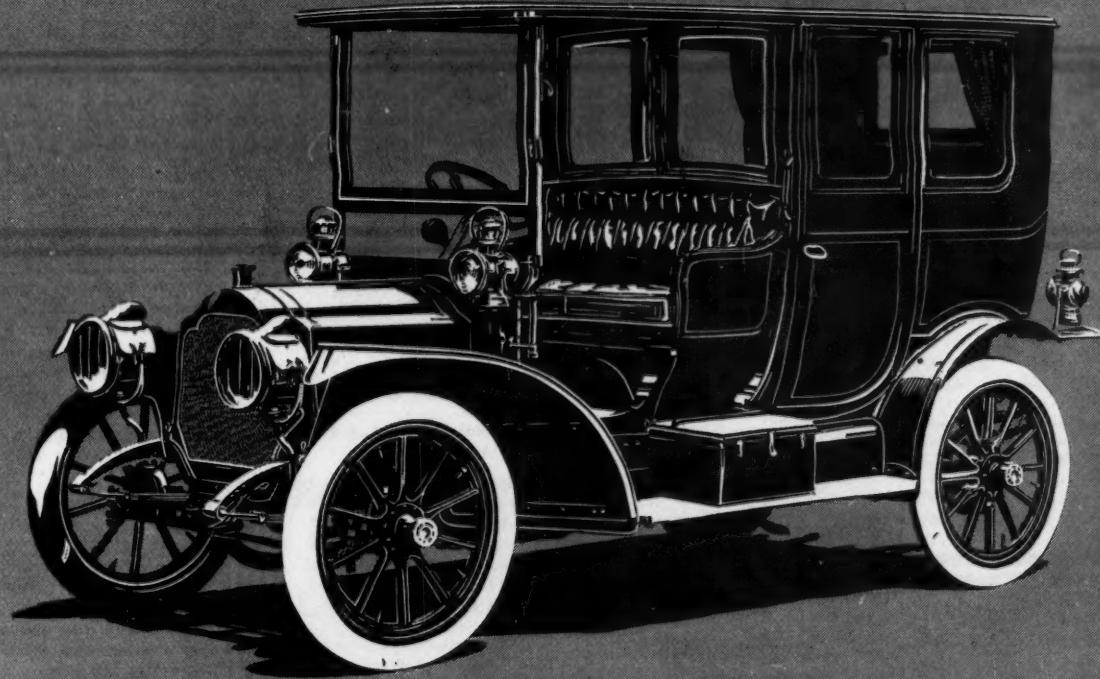
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Pantosote Co.13
Parker Mfg. Co.	m19
Parker-Stearns & Co.	j17
Peerless Specialty Co.	m15
Pennsylvania Auto Motor Co.	n5
Pennsylvania Rubber Co.	j17
Perfection Non-Skid Climber Co.	m14
Perfection Spring Co.	f10
Perfection Wrench Co.	m19
Petrel Motor Car Co.	b3
Peugeot Freres.	f11
Phoenix Auto Supply Co.	g10
Piggins Bros.440
Premier Motor Mfg. Co.11
Prest-O-Lite Co.	k7
Price, H. W., Co.	m3
Q	
Quincy, Manchester, Sargeant Co.	m9
R	
Rajah Auto Supply Co.	n4
Randall-Faichney Co.	m16
Rapid Motor Vehicle Co.	e7
Rauch & Lang Carriage Co.	c4
Regal Motor Car Co.	a9
Reliable Dayton Motor Car Co.	d4
S	
Remy Electric Co.	HH
Republic Rubber Co.	j17
Ricketts Automobile Wks.	a38
Robert Instrument Co.	m15
Roehracher Auto Air Pump Co.	m18
Rome Turney Radiator Co.	g12
Robbins & Co., Irvin.16
Royal Equipment Co.Cover
Royal Tourist Car Co.	a8
Rushmore Dynamo Works.	k6
T	
Safety Device Co.	m12
Salisbury Wheel & Mfg. Co.	j11
Schacht Mfg. Co.d6
Schoekopf Mfg. Co.13
Schrader's Sons, A.	j17
Selden Motor Vehicle Co.	a12
Shaler, C. A., Co.m4
Sharp Arrow Auto Co.	b10
Sireno Co., The.	m20
Smith Co., A. O.19
Spacke Machine Co., F. W.	g10
Spare Motor Wheel Co. of America, Ltd.	m20
Special Motor Vehicle Co.	m17
Speedwell Motor Car Co.	g6
Spicer Universal Joint Mfg. Co.	f10
Splitdorf, C. F.	h4
Sprague Umbrella Co.14
Standard Co., The.	m18
Standard Welding Co.	f10
Stanley & Patterson.	h13
Star Speedometer Co.	m13
Stearns-Duryea Co.m41
Steward, D. M., Mfg. Co.	k7
Stewart & Clark Mfg. Co.	m5
Stitch-in-Time Vule. Co.	m18
Stromberg Motor Devices Co.	g5
Studebaker Automobile Co.n2
Supplementary Spiral Spring Co.	FF
Swinehart Clincher Tire & Rubber Co.	j15
U	
Thomas Motor Car Co., E. R.	a42
Timken Roller Bearing Axle Co.	f4
Tingley, Chas. O., & Co.n2
Trenton Rubber Works.	f10
Trimont Mfg. Co.	m18
Triple Action Spring Co.	f11
Triple Thread Auto Tire Mfg. Co.	m10
Troy Carriage Sun Shade Co.	m16
Tudor Mfg. Co.	MM
Tufting Machine Supply Co.	m16
V	
Vanguard Mfg. Co.	m20
Unit Coll Co.n4
Universal Auto Spring Co.	f10
Universal Auto Tire Remover Co.	m17
Universal Tire Protector Co.	m16
W	
Waban Webbing Co.	n4
Warner Instrument Co.	m15
Warner Pole & Top Co.15
Watt-Detroit Carburetor Co.	g12
Weed Chain Tire Grip Co.	m18
Western Motor Co.g7
Wheeler & Schebler.	GG
White & Bagley.	LL
White Co., The.Cover
Whitney Mfg. Co.	f10
Widmer Machine Works, C. A.	g9
Willard Storage Battery Co.	k7
Willits, R. W., Auto Acc. & Mfg. Co.	m18
Winton Motor Carriage Co.	n3
Witherbee Ignition Co.	h12
Woodstock Hotel Co.	h2
Woods Motor Vehicle Co.	CC
Wright Cooler & Hood Mfg. Co.	g10
Y	
York Motor Car Co., The.	a22
Z	
Zimmerman Mfg. Co.	d4

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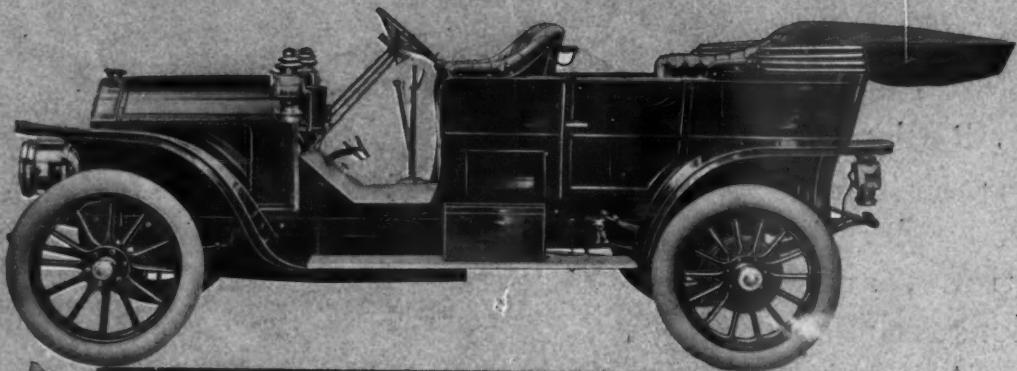
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